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ABSTRACT

The 1999 issues of "Notes on Linguistics," published quarterly, include the following articles, review articles, reviews, book notices, and reports: "A New Program for Doing Morphology: Hermit Crab"; "Lingualinks CD-ROM: Field Guide to Recording Language Data"; "'Unruly' Phonology: An Introduction to Optimality Theory"; "Borrowing vs. Code Switching: Malay Insertions in the Conversations of West Tarangan Speakers of the Aru Islands of Maluku, Eastern Indonesia"; "What's New in Lingualinks Bookshelf"; "What's New in Lingualinks Workshops"; "The 24th UWM Linguistics Symposium"; "Multidimensional Exploration of Online Linguistic Field Data"; "Derivations and Constraints in Phonology"; "A Language of Our Own: The Genesis of Mischief, the Mixed Cree-French Language of the Canadian Metis"; "The Projection of Arguments"; "Facilitating Orthography Development with Mother-Tongue Speakers"; "University College London Working Papers in Linguistics, Volumes 8 and 9"; "Psychology for Language Teachers: A Social Constructivist Approach"; "Reference and Referent Accessibility"; "Approaches to Language Typology"; "Anaphora and Conceptual Structure"; "Semiotic Grammar"; "A Theory of Predicates"; and "Salsa V: Proceedings of the Fifth Annual Symposium about Language and Society." Articles are extensively referenced. (KFT)

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From the Linguistics Department

Mike Cahill named as International Linguistics Coordinator

I'd like to introduce to you the new International Linguistics Coordinator. Mike Cahill graduated from Iowa State University in 1977 with a BS in biochemistry and a teacher's certification. In 1981 Mike joined SIL and went to Ghana in 1983. In 1985, Mike completed an MA in linguistics at UTA. He also attended SILs at Grand Forks and Norman. He has now completed course work for a PhD in linguistics at Ohio State University and is writing his dissertation. In his dissertation he is analyzing and describing the morphological and phonological patterns of the Konni language in terms of Optimality Theory.

In addition to his educational background, Mike has field experience in Africa. For 8 years, he and his wife, Ginia, were involved in a language project among the Koma people of Ghana, who speak the Konni language. He also has experience in administration in Ghana, and teaching at SIL schools, as well as at Ohio State University.

Following the completion of his dissertation, Mike plans to continue research on 1) the phonetics, phonology, and history of labial-velar consonants, 2) tonal associative morphemes, and 3) the reconstruction of proto-Buli-Konni. He is also interested in the Gur language family in general.

Mike and Ginia have three children, Deborah, Laura, and Stephen. So Mike is also a busy and devoted husband and father. In his spare time, he loves playing his 12-string guitar.

I happily turn over the role and responsibilities of the International Linguistics Coordinator to Mike. I think he will do a great job!

—Lou Hohulin
Outgoing International Linguistics Coordinator

Steven Bird named as International Linguistics Advisor

We are pleased to announce the appointment of Steven Bird as a newly named International Linguistics Advisor to SIL. Many of our colleagues, especially in Africa, will be quite familiar with Dr. Bird. For those not yet familiar with him or his work, he has kindly provided us with an autobiographical sketch in which he notes in particular his contacts and associations with SIL. We are honored to count him as a friend and advisor. —David Payne, Editor

It's hard to pinpoint where my fascination with tone languages and field linguistics began. My unlikely background was a double major in mathematics and computer science (Melbourne University, 1982-85). My pure mathematics lecturer, John Upton, was on the board of SIL Australia, and had published research on mathematical linguistics with Kenneth Pike. With his intriguing remarks about phonemes and allophones ringing in my ears, and the firm assurance that my science background was well-suited to linguistics, in 1986 I embarked on postgraduate studies bridging the computer science and linguistics departments. At about the same time I paid a visit to the South Pacific SIL School in Melbourne to meet the director, Karl Franklin. While there I happened upon some texts decorated with a forest of numbers which looked reassuringly mathematical. On learning that the texts were from a tone language I was simply awestruck. What kind of language was this?

The linguistics classes were fascinating, but also disappointing in some respects. Although we were surrounded by real language we had to rely instead on introspective judgments about the well-formedness of bizarre sentences. And although we were learning about formal linguistic theories, linguists did not use the tools that mathematics and computer science offer for defining and reasoning about formal systems. Unsurprisingly, there was an abundance of anecdotal data and polemical argument in the literature. At the height of my disillusionment I discovered the now classic GPSG book (*Generalised Phrase Structure Grammar*; Gazdar, Klein, Pullum & Sag, 1985). It dealt with all of the same English constructions familiar from the generative syntax course, but was sufficiently formal and explicit to be implementable on computer. With that I settled on another change of direction. Rather than complete my doctoral studies at Melbourne I took out an MSc after the first year, and in 1987 my wife Kay and I relocated to Scotland so I could study at Edinburgh University under one of the GPSG authors, Ewan Klein.

Edinburgh provided a magnificent learning environment. I undertook a second MSc—this time by coursework rather than thesis—in 'cognitive science', opening the door to computational linguistics, formal semantics, psycholinguistics and generative syntax of the GB and HPSG varieties. When it came to finding a research topic, the heavy reliance on subjective grammaticality judgements bothered me and I soon switched from syntax to phonology. This, I assumed, must have a solid empirical foundation. After all, phonological data could be recorded on tape, something that was impossible for grammaticality judgments. One small matter still had to be resolved - which language would I look at? The advice that I avoid tone languages due to their difficulty was decisive. I went out and found two speakers of Kikuyu (Kenya) studying in Edinburgh and started making recordings. This was my first experience of fieldwork, and my excitement at working with real language data was palpable. My musical training helped me to reproduce and transcribe tone melodies. Mysteriously, I was unable to reconcile my transcriptions with those reported in the pages of one of the flagship linguistics journals. The author told me that the published transcriptions abstracted away from predictable allophonic details which he could no longer reconstruct. Only then did it dawn on me that transcriptions, the primary data of phonology, are no less impressionistic than grammaticality judgements. Scared off the data, my PhD research focused on the mathematical and computational foundations of phonological constraints. Klein and I collaborated on the formal semantics of phonological diagrams [1]. This was a major building block for the thesis, completed in 1990 and published in 1995 [2]; see Maxwell (*Notes on Linguistics 76,* Feb 1997*)* for a review.

In the original scheme of things, 1991 was supposed to find me engaged in fieldwork in a non-Western country. However, no one could tell me where to go, and I hadn't a clue myself. A three year UK government grant to study 'finite-state' models of phonology gave me time to find the answer to this question, and meanwhile to broaden my research interests. With two collaborators I explored the use of finite-state automata for autosegmental phonology, and showed how the result could be connected up to constraint-based theories of grammar [3,4]. Also during this period I founded the Special Interest Group in Computational Phonology [5] and edited a collection of papers on this topic [6].

In 1991 I discovered Hyman's paper on tone in Bamileke Dschang (Grassfields Bantu), which appeared in *Phonology Yearbook 2*. Skeptical about Hyman's eight complex, ordered tone rules, I began working with some Dschang speakers studying in Edinburgh. Unable to simplify his analysis and now suspicious about the data, I applied for a small grant to visit Cameroon and make recordings. The SIL team working on Dschang hosted me, and helped me record Hyman's data with a dozen speakers from all over the language area. They had not solved the riddle of the tone system either, and encouraged me to return and work on it. With new funding (1994-98) I returned to Cameroon in January 1995 with my family. We stayed for two and a half years, and I continued my research on the language and contributed to SIL as a linguistics consultant (with the SIL status of 'short term assistant').

The consultant work was invigorating. After learning the ropes from linguistics consultants Keith Snider, Robert Hedinger and Jim Roberts, I was entrusted to 'hold the fort' for over a year during their absence. This enabled me to interact with some 15-20 field teams, and to learn about the different technical and personal challenges they faced, about their diverse ways of responding to those challenges, and appropriate ways I could help out. This taught me a lot about working with people; they were very gracious about 'not noticing' when I was obviously winging it. This time also exposed me to SIL administration and language programme planning, and I enjoyed working with Ellen Jackson, Sue Glidden, Greg Trihus and many others. Workshops and university colleagues and students nicely rounded out the intellectual environment. This time with SIL was the most stimulating stage of my career. Having a field linguist and a mother-tongue speaker roll up with an interesting data problem, or spending a week in a village location surrounded by an undescribed language with so much to discover, were the nearest things to paradise.

Now, finally, I had unlimited access to live tone language data. Pursuing my research on Dschang, I verified Hyman's 8x8 paradigm and collected some large datasets, such as a much richer paradigm with 1440 entries, hoping to have many more pieces of the jigsaw puzzle to play with. But to the person stuggling with a 64-piece puzzle, moving up to a 1440-piece puzzle was not such a bright idea. The datasets were simply unmanageable and I was soon swamped. To dig myself out, I began writing various utilities in the Perl language on my Linux laptop. This grew into the HyperLex system, a data management and analysis tool combining digitised recordings, pitch traces and transcriptions [7], connected to a Shoebox lexicon for the language, later published as [8]. An example of HyperLex applied to the segmental phonology of Dschang is given in [9]. A similar tool was developed for managing large, multidimensional verb paradigms, and this formed the basis of my tone analysis work (e.g. [10]). Like my first exposure to tone writing, I found the Dschang orthography to be heavily decorated with diacritics, only this time they were accents rather than numbers. Relying heavily on excellent descriptions in SIL *Notes on Literacy* and *Notes on Linguistics*, I surveyed the methods used for marking tone in orthography [11]. The wealth of approaches amazed me, and I quickly cooked up a simplified tone marking scheme that I was sure would be accepted. However, speakers of the language rejected the proposed change. They had been convinced of the need to distinguish tonal minimal pairs and wanted to stick with their subphonemic tone orthography. However, they also reported cases where distinct tone melodies were not distinguishable in the orthography, and told me how they added further tonal annotation to a tone-marked text to facilitate correct reading in public. With that bait I undertook a reading and writing experiment, showing that the tone orthography hindered fluency to such an extent that readers did better with tonally unmarked texts [12]. Yet, as further testament to my naiveté, I mistakenly assumed that the experiment would be an agent for change. When it was not, I stood back from the whole situation and began studying the history and politics of tone orthography [13].

The UK grant ended in July 1998 and we relocated once more, this time to the US. I am currently at the University of Pennsylvania, serving as the associate director of the Linguistic Data Consortium (LDC) and adjunct associate professor in computer science and linguistics. This semester I am teaching courses in cognitive science and field methods, and continuing to work on a computational linguistics textbook [14] and a chapter on computational phonology [15].

LDC is an open consortium of universities, companies and government research laboratories, hosted by the University of Pennsylvania. LDC creates, collects and publishes text and speech corpora, including lexicons, newswire texts, broadcast news recordings and transcripts, telephone conversations and aligned parallel texts. Since its foundation in 1992, the LDC has published some 150 digital databases covering Egyptian Arabic, English (many varieties), Farsi, French (including Canadian), German, Hindi, Japanese, Korean, Mandarin Chinese, Nahuatl, Portuguese, Spanish (including Caribbean), Taiwanese Putonghua, Tamil, Vietnamese and Yoruba. One of my tasks at LDC is to develop tools like HyperLex to make the data available on the internet for linguistics research.

Alongside this there are three other areas of activity. First, I am continuing to investigate the tone system of Dschang and some related languages of Cameroon. Second, in joint work with Mark Liberman, I am working on a universal framework for annotated linguistic databases [16]. Finally, in collaboration with Mark Liberman and Peter Buneman (Penn), Akin Akinlabi (Rutgers) and Will Leben (Stanford), we are developing a new model of collaborative linguistic fieldwork over the internet which we have dubbed 'linguistic knowledge networking'.

My curiosity about tone systems and my commitment to working with live field data have only grown with the experiences described above. I feel especially fortunate that it has been possible to pursue these interests unabated across three very different appointments in three very different places, and I am delighted to be able to continue my association with SIL, the foremost organisation engaged in field-based linguistics research. In a subsequent issue of *Notes on Linguistics* I plan to report on some aspects of these activities which impinge on linguistic fieldwork and on the computational tools which support fieldwork.

—Steven Bird
Linguistic Data Consortium
University of Pennsylvania

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(refer to www.ldc.upenn.edu/sb for a full list, including online versions).

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Tribute to Charles Ferguson
International Linguistics Advisor

Professor Charles Ferguson passed away a few months ago (September 1998). In addition to his numerous accomplishments and activities, he served for many years as an International Linguistics Advisor to SIL. Patricia Davis represented SIL at his funeral, and gathered the comments below as a tribute from some of his friends and admirers in SIL.

Charles Ferguson's legacy lives on—It lives on in Ethiopia:

> Until the late 1960s, the study of languages in Ethiopia was largely confined to the study of Semitic languages, despite the fact that there were at least 75 other languages in the country. Ferguson led the Language Survey of Ethiopia, a project that revolutionized the study of languages in Ethiopia, providing both a new impetus and a body of knowledge. The published results of that work are still regularly consulted today by anybody dealing with Ethiopia's languages and ethnic groups: Ethiopian government officials, linguists, anthropologists, literacy planners. Ethiopian scholars were also trained under this program, scholars whose students today are now carrying on the study of Ethiopia's languages.
>
> As an organization, SIL has specifically benefited from Charles Ferguson's work in Ethiopia probably more than any other single organization. The language survey work, the labeling and the classification of languages in Ethiopia done under him have all enabled SIL better to serve the minority language groups of this nation in literacy and translation. Charles Ferguson gave Ethiopian linguistics a large body of written data, a much broader scope, and new energy. He also helped give it a warmer, more cooperative spirit. He will be missed; he will not be replaced. —Peter Unseth, SIL field linguist, Ethiopia

It lives on in Guatemala:

> SIL colleagues in Guatemala who attended a seminar Dr. Ferguson presented also remember him for his gift in promoting cooperation among entities at a

> time when differences of opinion over orthography design had become a debated issue. The advice he gave at that time has proved valid over time. —Paul Lewis, Int'l Sociolinguistic Coordinator

It lives on through his students:

> Dr. Ferguson was known as a favorite professor at Stanford; everyone wanted to take his classes. He was recognized in the university for his personal kindness and generous giving of time to his students. Once when he was on vacation, he even loaned me his car. —Ronald Anderson, former SIL Literacy Specialist now Assistant Professor of Education at Texas A & M Int'l University - Laredo

It lives on through his writings:

> Dr. Ferguson published profusely on an unusually broad range of topics and is recognized as an authority in them all. When researching the mechanics of literacy acquisition among minority language groups, I found him to be one of the few authors who had written on the subject and was grateful to be able to reference him. —Patricia Davis, SIL Int'l Literacy and Educational Consultant

> Among Dr. Ferguson's many publications in linguistics, a few on universals of nasality were by far the most influential pieces of literature I referenced in my own first linguistics research—on the intricacies of nasality in a Peruvian indigenous language. Dr. Ferguson's synthesis of material from a huge range of languages into clear presentations on the typology of nasality continues to serve as a wonderful model for ongoing work in typology and universals. —David Payne, SIL field linguist, Peru; former Int'l Linguistics Coordinator

It lives on as a result of his willingness to help others:

> Dr. Ferguson not only gave of his time to attend a Vernacular Literacy Conference held in Stanford for SIL members in 1991 and to lecture at a Conference for SIL Literacy Specialists in 1995, he generously permitted his wife to share her expertise. As a member of an Advisory Board to SIL's International Literacy Department, Dr. Brice-Heath has provided much-appreciated guidance for educational programs in our organization. We know it cost them both precious hours they might have otherwise spent together. —Steve Walter, Int'l Literacy Coordinator

SIL colleagues world-wide join the academic community in remembering Charles Ferguson as a dedicated researcher, practical theoretician, role model and friend. These legacies remain with us as enduring monuments.

—Patricia Davis
SIL Int'l Literacy and Educational Consultant ■

A new program for doing morphology: Hermit crab

Mike Maxwell
SIL—Academic Computing and International Linguistics Consultant

1 Introduction. This paper[1] introduces a new computer program for working with morphology, Hermit Crab. Hermit Crab resembles some of the tools in the traditional CARLA (Computer Assisted Related Language Adaptation) suite in that it can be used to create an analysis of the morphological component of a language's grammar, and can parse words into their morphemes (like AMPLE) or generate words out of morphemes (like STAMP).[2] Hermit Crab differs from these programs in that it takes a process view of morphology: in line with many modern theories of morphology, affixation is viewed not as the result of concatenating allomorphs, but as a process that modifies the form of a word. This makes it nearly as easy to describe infixation, reduplication, and other sorts of 'exotic' morphology as it is to describe prefixation or suffixation. Furthermore, Hermit Crab employs a version of generative phonology to create allomorphs. Hermit Crab therefore implements 'Item and Process Morphology' in both senses of this term.[3] Finally, Hermit Crab uses a linguistically motivated treatment of morphosyntactic features and their 'percolation', making it straightforward to restrict the co-occurrence of affixes and stems.

Hermit Crab utilizes LinguaLinks (version 2.5 and later) for its user interface. This provides not only an easy way to build rules and other complicated structures, but also a grammar debugging environment.[4]

---

[1] I am thankful to Andy Black for his helpful comments on an earlier version of this paper.

[2] AMPLE is described in Weber, Black, and McConnel (1988), and STAMP is described in Weber, McConnel, Black, and Buseman (1990). In addition to its synthesis (generation) capabilities, STAMP also has some transfer capabilities, e.g. reordering morphemes between a source language and a target language. Hermit Crab does not deal with transfer.

[3] The term 'Item and Process Morphology', as originally used by Hockett (1954), referred to a theory in which affixation was a process of modifying a stem, as opposed to the simple concatenation of morphemes. The term has also been used for theories in which a word may be modified from its 'underlying form' by phonological (morphophonemic) rules.

[4] Hermit Crab is a separate application running under Microsoft Windows, and communicates with LinguaLinks via the Windows 'DDE' messaging protocol. (The name 'Hermit Crab' comes from this separation between a parsing engine (the "crab") and a user interface (the "shell"): the shell provides a pretty interface and a user interface to the engine's ugly command

Sections two and three of this article describe the morphological and phonological capabilities of Hermit Crab from a linguistic viewpoint. Section four presents some example analyses using Hermit Crab, while section five describes some of the limitations of this program. Section six outlines possible enhancements for the future.

2 Morphological capabilities of Hermit Crab

2.1 Morphological processes. As mentioned above, Hermit Crab takes a process view of morphology: affixation is seen not as the simple concatenation of allomorphs or morphemes, but as a sequence of steps in which a stem is modified to create a word. Each step represents the attachment of a single affix, but in addition to simple prefixes or suffixes, it is straightforward to describe infixation, reduplication, suprafixation, and even truncation processes. The process view of affixation can be traced back at least to Hockett (1954), but has been revived within the generative linguistics tradition by Aronoff (1976); Anderson (1992) is a more recent description.

As an example of a morphological process, consider an affix whose phonological effect consists of reduplicating the first syllable of the stem. Up until the most recent version of AMPLE, it has been necessary to list all possible allomorphs, i.e. all word-initial syllables (or at least those which occur on stems that undergo reduplication).[5] In Hermit Crab, such an affix would instead be represented as the following morphological rule:

$$\begin{array}{ccccc} CV & X & & & \\ 1 & 2 & \rightarrow 1 & 1 & 2 \end{array}$$

C and V are 'natural classes', representing consonants and vowels respectively, while X is a variable that represents anything at all—in this case, the remainder of the stem. Natural Classes have a similar function to 'string classes' in AMPLE, but are defined as a set of phonetic features rather than as a set of character sequences. The user defines the natural

---

structure.) In theory, one could build the rules and other necessary structures using any text editor, then run Hermit Crab from another application which supports the DDE protocol. This is not recommended, as it is very difficult to write rules in the correct format without the structured editor facilities provided by LinguaLinks, and next to impossible to interpret the debugging information without the special display facilities of LinguaLinks.

[5] Version 3.2.0 (1 October 1998) of AMPLE allows for creating reduplicative allomorphs automatically, using a notation related to Hermit Crab's. Those allomorphs are stored internally to AMPLE, whereas in Hermit Crab, the reduplicant is created on the fly. Because phonological rules may modify the reduplicant apart from the base (or the base apart from the reduplicant), Hermit Crab allows the reduplicant to differ in phonological form from the portion of the base, something which is still not easily done in AMPLE.

classes to be used in the analysis of a language; they can be as simple as the set of consonants or vowels, or as complex as the set of non-low back unrounded vowels.

The process notation illustrated above also makes it easy to represent infixes. For instance, the following morphological process would infix *i* and *a* after the first and second consonants respectively of a triconsonantal root (similar processes are found in many Semitic languages):

C	C	C						
1	2	3	→	1	*i*	2	*a*	3

Other sorts of affixes which are easily represented as morphological rules include suprafixes, simulfixes, circumfixes, zero morphemes, and affixes of truncation, as well as ordinary prefixes and suffixes.

2.2 Allomorphy. In Hermit Crab, morphological rules may have subrules, which can be useful for representing allomorphs. (It is also possible to derive allomorphs using phonological rules, as will be described in section 3.) For instance, if the above infixing process resulted in a different form for biconsonantal roots (e.g. by epenthesizing some additional consonant, or by reduplicating one of the consonants of the stem), that could be easily represented as an additional subrule.

Subrules of morphological (and phonological) rules apply in disjunctive order, allowing the use of an 'elsewhere case'. For instance, the English regular plural noun suffix can be described as follows: if the stem ends in a strident (sibilant) sound, append *–əz*; otherwise, if the stem ends in a voiceless sound, append *–s*; otherwise (the elsewhere case), append *–z*. Such an affix could be represented by the following three subrules (assuming the user has defined the two natural classes *strident* and *voiceless*):[6]

X	Strident				
1	2	→	1	2	*əz*
X	Voiceless				
1	2	→	1	2	*s*
X					
1	→	1	*z*		

---

[6] This example is merely illustrative, and not intended to represent the appropriate analysis of this English affix. Since several other affixes and a clitic behave in a similar fashion, a better analysis might postulate a single underlying form, together with phonological rules to generate the allomorphs.

Since the ordering of these three subrules is disjunctive, the application of the first subrule to *pleɪs* 'place' to give *pleɪsəz* blocks the application of the second and third subrules, preventing incorrect forms like **pleɪss* or **pleɪsz.*[7]

The above example also illustrates the fact that the use of morphological rules does not greatly complicate the description of ordinary suffixation (and prefixation). In fact, for any affix that has been marked as a prefix or suffix in the LinguaLinks lexicon, Hermit Crab can automatically generate a simple rule, which the user may use 'as is' or modify as necessary.

2.3 Morphosyntactic Properties of Affixes. In addition to their phonological properties, affixes are characterized by semantic and morphosyntactic properties. The English plural noun suffix, for instance, attaches to a singular noun (not a plural noun: **scissorses*) to produce a plural. Hermit Crab therefore allows the user to specify the part of speech (category) of the stem to which an affix attaches, and (for derivational affixes, but not inflectional affixes) the part of speech of the word resulting from the affixation process. In addition, the user can specify any restrictions based on morphosyntactic features (such as the requirement that the stem be [-plural]), and the set of morphosyntactic features added by the affix (such as [+plural]). The morphosyntactic features of the affixed word are defined by a special percolation algorithm: the features of the output are those of the affix and stem, except that the features of the affix override any conflicting features of the stem. For instance, if the noun *dog* was provided in the lexicon with the features [–plural +animate], the attachment of the plural affix would result in a word with the features [+plural +animate].[8]

This linguistically motivated form of feature percolation should be contrasted with the treatment of morpheme properties (which do the duty of morphosyntactic features) in AMPLE. In AMPLE, ALL the properties of the other morphemes of the word are visible to any given morpheme. While it is possible in AMPLE to restrict attention to the morpheme immediately to the left or right, or the second morpheme to the left or right, or to all the morphemes to the left or right, there is no general notion of a hierarchical order of affixation in which each affix can override the morphosyntactic properties supplied by other affixes or by the root. The ability of an affix to override features present in the stem to which it attaches appears to be a general property of human language (Lieber 1980, and Di Sciullo and Williams 1987), and this behavior has therefore been built into Hermit Crab. The result is a great simplification in what the grammar writer needs to do in order to capture the morphosyntactic properties of affixation (see Maxwell 1996 for further discussion).

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[7] Blocking works both in parsing and in generation. Thus, if the incorrect form **plesz* appears in a text, Hermit Crab will report failure to parse it (assuming the appropriate lexical entries and rules).

[8] Again, this example is merely illustrative; the putative morphosyntactic feature *animate* has little or no role in English morphosyntax.

2.4 Realizational Morphology. There is one area of morphology in which some linguists have argued that percolation is NOT the appropriate way to treat morphosyntactic features, namely inflectional morphology (as opposed to derivational morphology). These linguists (see e.g. Anderson 1992, Matthews 1972a, Matthews 1972b, and Zwicky 1985) have proposed a 'realizational' treatment of inflectional morphology, in which inflectional affixes realize, rather than impose, morphosyntactic features. Under the theory of realizational morphology, then, the derivation of a word like *dogs* would begin with the singular stem *dog*, together with a set of morphosyntactic features to be realized: in this case, the feature [+plural]. The attachment of the plural suffix would be triggered by the presence of this feature among the set of features to be realized. While the advantage of this approach is not apparent in such a simple example, the realizational approach greatly simplifies cases in which there is a set of affixes that fills some slot.[9] It is generally the case that the affixes belonging to a slot can be arranged in order from most specific (in the sense of realizing the largest set of morphosyntactic features) to least specific, with a default affix applying when no other affix of the slot matches the features to be realized. If there is no default affix for a particular slot, the effect is equivalent to a zero affix, but without the drawbacks of actually postulating a zero morpheme. Realizational morphology is also well suited to languages which exhibit *extended exponence*, the situation in which more than one affix marks some morphosyntactic feature. (See Matthews 1972a, 1972b for some examples of extended exponence.)

In light of the advantages, both theoretical and practical, of realizational approaches to morphology, Hermit Crab allows the user to define templates for realizational affixes. Each template pertains to a particular part of speech, and contains a sequence of slots to which the various realizational affixes belong. Within each slot, the order of the member affixes defines the order in which those affixes are tested against the set of morphosyntactic features to be realized. As discussed in the previous paragraph, this order is generally from most specific to least specific, with a disjunctive ordering assumed: the first affix of a slot that realizes a subset of the morphosyntactic features to be realized is attached, blocking the attachment of the remaining affixes of that slot. The realizational affixes themselves are given in the LinguaLinks lexicon, together with the morphosyntactic features that each affix realizes.

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[9] The term 'slot' is used here in the sense of a set of mutually exclusive affixes which fill some general morphosyntactic role, but which need not all appear in the same position relative to the stem (although they generally do). For instance, one affix of such a slot might be an infix, while another was a prefix.

3. Phonological Capabilities of Hermit Crab. Hermit Crab implements a version of generative phonology, which I will refer to as 'classical generative phonology'. This is close to the kind of feature-based phonology which preceded autosegmental phonology,[10] of the kind popularized by *The Sound Pattern of English* (Chomsky and Halle 1968; see also Schane 1973, Hyman 1975, and Kenstowicz and Kisseberth 1979), enriched by the notions of strata (levels) of rules, as proposed by lexical phonologists in the 1980s (Mohanan 1986, 1995; Kaisse and Shaw 1985; Kenstowicz 1994, chapter five). For readers who are not familiar with these theories, I will contrast them with two other theories which may be more familiar: structuralist phonology (of the American variety), and autosegmental phonology.

Classical generative phonology differs from structuralist phonology in at least three major ways. The first is that segments (phones, phonemes, and morphophonemes) are analyzed as bundles of features, where each feature is phonetically based, and usually (but not necessarily) binary (i.e. '+' or '–'). Under such a system, classes of sounds which often behave as a group in human languages—natural classes—emerge naturally, being the sounds which are picked out by a small set (often just one) of phonetic feature values.[11] For instance, the set of stops and affricates in English are selected by the feature value [-continuant], and the set of voiceless stops and affricates by the set of feature values [-continuant -voiced]. Hermit Crab allows the user to define a feature system, assign features to the segments of the language, and define natural classes on the basis of sets of feature values.

Another way in which classical generative phonology (at least in its original form) distinguished itself from structuralist phonology, was in the rejection of the idea of a distinguished phonemic level, or indeed in the rejection of any distinguished levels[12] between that of the 'underlying form' and the 'surface form'. This is not the place to go into the reasons for that stance; rather, I will note that the theory of lexical phonology represented a step back towards (but not to) the earlier notion of significant intermediate levels. Under lexical phonology, the phonological rules were assumed to belong to specific strata of rules[13] the result of applying all the phonological rules of a given stratum to some word was a representation of a distinguished intermediate level. Theorists differed in the number of strata required to describe language; indeed, it was often assumed that the number of strata was a language-particular matter. Nonetheless, most lexical phonologists assumed at least one intermediate level, the post-lexical level, resulting from the application of the phonological rules of the lexical stratum, and preceding the application of the rules of the post-lexical stratum. To some extent, this level resembled the structuralist's phonemic level but there were differences.[14]

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[10] Autosegmental phonology has since replaced classical generative phonology; I will return to the question of what it would take to implement autosegmental phonology in a parser in section 5.

[11] The phonetic features relevant in a given language are often referred to as 'distinctive features', since they serve to distinguish the sounds of that language. I will continue to use the descriptive term 'phonetic features', to distinguish these features from morphosyntactic features and from rule (exception) features.

In addition to having phonological rules apply in strata, an important property of lexical phonology was the idea that morphological rules (or the affixes which they represented)[15] also belonged to strata. The fact that both morphological and phonological rules applied in strata meant that the output of the 'shallower' morphological processes might not be subject to phonological rules which the output of deeper morphological processes were subject to. Alternatively, phonological processes which apply at a deeper level might appear to overapply to a reduplicated affix (in the sense of having applied in an environment where they should not have applied), because they in fact apply to the base before reduplication takes place, so that the change they effect is copied over to the new environment. (See Wilbur 1973, Aronoff 1976:73ff; see also McCarthy and Prince 1997 for discussion of this phenomenon in the context of a different theory.)

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[12] By 'distinguished level', generative phonologists meant a level which had some special properties, as structuralist phonologists claimed for the phonemic level. In classical generative phonology, the phonological rules are applied in linear order, with the output of each rule being a sort of level by itself. The important point was that none of these intermediate representations resulting from the application of phonological rules had any important properties which distinguished it from any other intermediate representation.

[13] Actually, a given phonological rule could apply in more than one stratum, provided that all the strata in which a given rule applied were adjacent.

[14] Perhaps the most important difference was that lexical phonology did not adhere to the principle of 'bi-uniqueness', because a segment at the phonetic (surface) level could be ambiguous between two segments at the post-lexical level. For instance, if a language had word-final devoicing, the phonetic segment *p* could come from either *b* or *p* at the post-lexical level. Such a situation in structuralist phonology would be equivalent to saying that [p] could be an allophone of either the phoneme /p/ or the phoneme /b/ at the phonemic level, which was ruled out under that theory.

[15] 'Morphological rules' is more general than 'affixes', because compounding and incorporation may also be included by the former term.

Hermit Crab follows the theory of lexical phonology in that it allows the user to define any number of strata, and assign morphological and phonological rules to these strata.[16] The shallowest stratum used by the parser need not be a completely phonetic level; indeed, if the linguist is only interested in parsing an orthographic representation, the shallowest level will probably be some sort of phonemic level.[17]

A third difference between structuralist phonology and generative phonology concerns rule ordering. Structuralists did not usually discuss this topic, but most expositions were consistent with the idea that at least allophonic rules applied simultaneously.[18] Classical generative phonology (as well as most other versions of rule-based generative phonology, such as derivational versions of autosegmental phonology) assumed that rules applied in linear order, that is one after another. That is, part of analyzing the phonology of a language is determining the order in which the rules apply, since different orders can lead to different results (and it was generally, although not unanimously, agreed that there were no universal constraints on rule order).

Hermit Crab implements linear rule ordering. Individual phonological rules can be applied in simultaneous fashion, or in left-to-right or right-to-left iterative fashion.

Autosegmental phonology was a development from generative phonology during the 1980s. The most radical difference was its rejection of the idea that a word could be represented by a linear sequence of segments, where each segment was a set of features. Instead, features are seen as arrayed in a

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[16] Hermit Crab does not currently implement the notion of cyclic rule application, commonly used in lexical phonology. Adding cyclic rule application would not be difficult; see section 5.

[17] Since Hermit Crab represents sounds internally by their feature composition, not by the orthographic (or other) characters used to represent them, the character representation of words needs to be unambiguously translatable into a feature-based representation. This would be a problem for an orthography like that of English, but for the orthographies most field workers deal with, this is not an issue.

[18] The fact that allophonic rules were intended to be applied simultaneously can be deduced from the fact that the environment of the rules was phonemic, not phonetic (Harris 1951, section 7.31 is one of the few explicit discussions of this requirement, but it appears to have been the general practice). Structuralist phonologists' expositions were also consistent with the idea that each individual rule applied simultaneously to an entire word, rather than iteratively. The status of morphophonemic rules in the grammar was uncertain, hence the question of whether they were ordered was even more uncertain.

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sort of tree structure.[19] As a result, it is possible to view phonological rules as deleting a node in this structure, or 'spreading' other nodes, that is, attaching them to multiple parent nodes. Syllabification (and other metrical structure) also plays an important part in modern approaches to phonology.

It is fair to say that autosegmental phonology has replaced 'classical' generative phonology.[20] From a computational perspective, however, it is much harder to see how autosegmental phonology can be implemented in a parsing algorithm. For that reason, Hermit Crab does not implement autosegmental phonology (although that is a possible future development). Nor does Hermit Crab implement metrical structure directly, although it is possible to simulate rule-based syllabification using features such as [onset] and [coda]. Again, it may be possible in the future to provide true metrical structure, with resyllabification taking place after each application of a phonological rule.

4 Examples of Hermit Crab Analyses. This section describes how a linguist might use Hermit Crab to do morphological analysis. It is assumed that the linguist has already created a dictionary in LinguaLinks, and has therefore defined one or more encodings (writing systems), which are more or less phonemically based. Affixes are listed in lexical entries in the LinguaLinks lexical database. From an Item-and-Process point of view, this is actually a debatable point, since the lexicon presumably consists of a set of morphemes, not processes. However, if one thinks of the LinguaLinks lexical database as a dictionary, rather than as a lexicon in the linguist's sense, this objection loses some of its force: the lexical database is simply a convenient repository for certain kinds of information, among which are lexical entries for morphemes (roots), stems and words, as well as for morphological processes.

4.1 Assigning Features to Segments. In order to set up Hermit Crab, the linguist would first create a phonological feature system. As mentioned earlier, built-in feature systems are provided, which the linguist can either use as-is, or modify as necessary; alternatively, one can produce a new phonological feature system from scratch.

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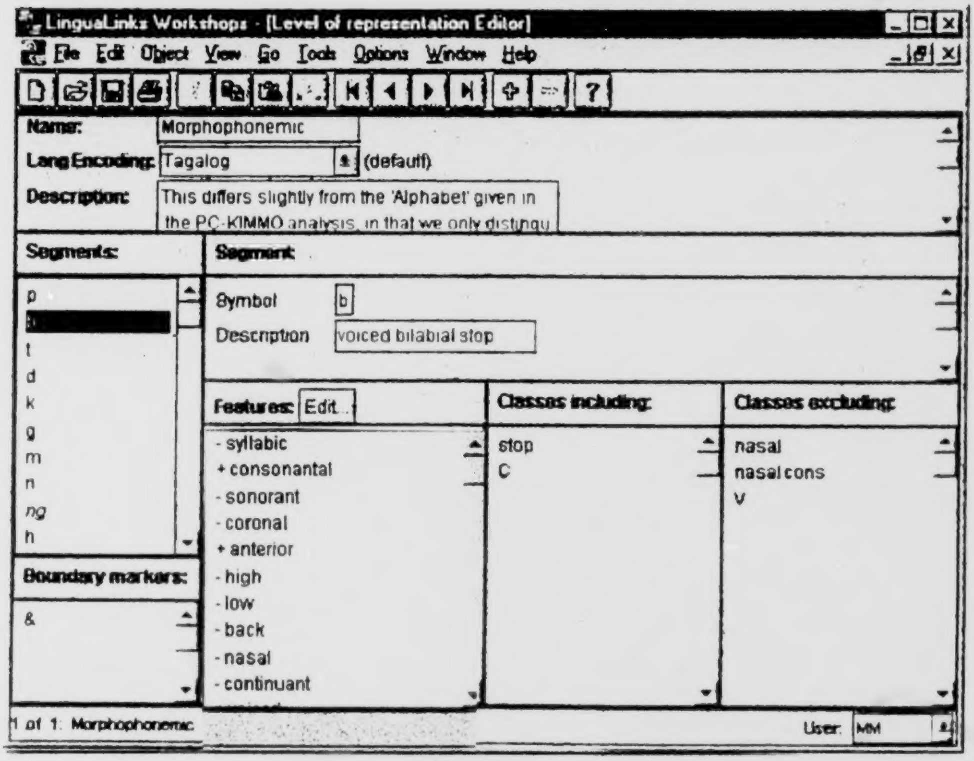
[19] Actually, a directed acyclic graph, which is a potentially more complicated structure than a tree.

[20] Derivational autosegmental phonology, in which the grammar consists of a series of rules, has in turn been largely superceded by declarative approaches, of which the chief is Optimality Theory. While it is too early to be certain, it appears that it would be computationally difficult to implement a parsing algorithm for Optimality Theory.

Next, the linguist needs to define the relationship between the encodings (writing systems) and the phonological feature system. This is done by creating a table listing the segments (phonemes, phones, etc.) for each encoding, together with their feature representation, as in the following screen snapshot (Figure 1):


LinguaLinks Workshops - [Level of representation Editor]
File Edit Object View Go Tools Options Window Help
?

Name: Morphophonemic
Lang Encoding: Tagalog (default)
Description: This differs slightly from the 'Alphabet' given in the PC-KIMMO analysis, in that we only distingu

Segments:
p
t
d
k
g
m
n
ng
h

Boundary markers:
&

Segment:
Symbol b
Description voiced bilabial stop

Features: Edit...	**Classes including:**	**Classes excluding:**
- syllabic	stop	nasal
+ consonantal	C	nasal cons
- sonorant		V
- coronal		
+ anterior		
- high		
- low		
- back		
- nasal		
- continuant		

1 of 1: Morphophonemic
User: MM

Figure 1

On the left-hand side of the screen, the linguist has defined a set of characters representing phonemes of the language (which happens to be Tagalog). Note that the phonemes are not restricted to single characters; one of the phonemes is represented by the digraph *ng*, and representations using diacritics are also possible. Having clicked on the phoneme *b*, the linguist has given it a description, and assigned a set of phonetic features. Elsewhere in Hermit Crab, the linguist has defined a number of natural classes; the two panes in the lower right-hand corner of the window show that the features assigned to *b* imply that *b* is included in the natural classes *stop* and *C* (consonant), but not in the natural classes *nasal*, etc. The use of a gray background for these two panes is intended to represent the fact that they cannot be directly altered by the user: the assignment of *b* to natural classes is derived from the phonetic features assigned to *b* and to the natural classes. That is, *b* belongs to the natural class of stops because this class is defined by

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the feature values [-continuant-delayed release], both of which are also assigned to *b*.

The user can also define boundary markers, which can be used to separate affixes and stems. While boundary markers have been superceded by other concepts in more recent theories of phonology, they can sometimes be useful in practice.

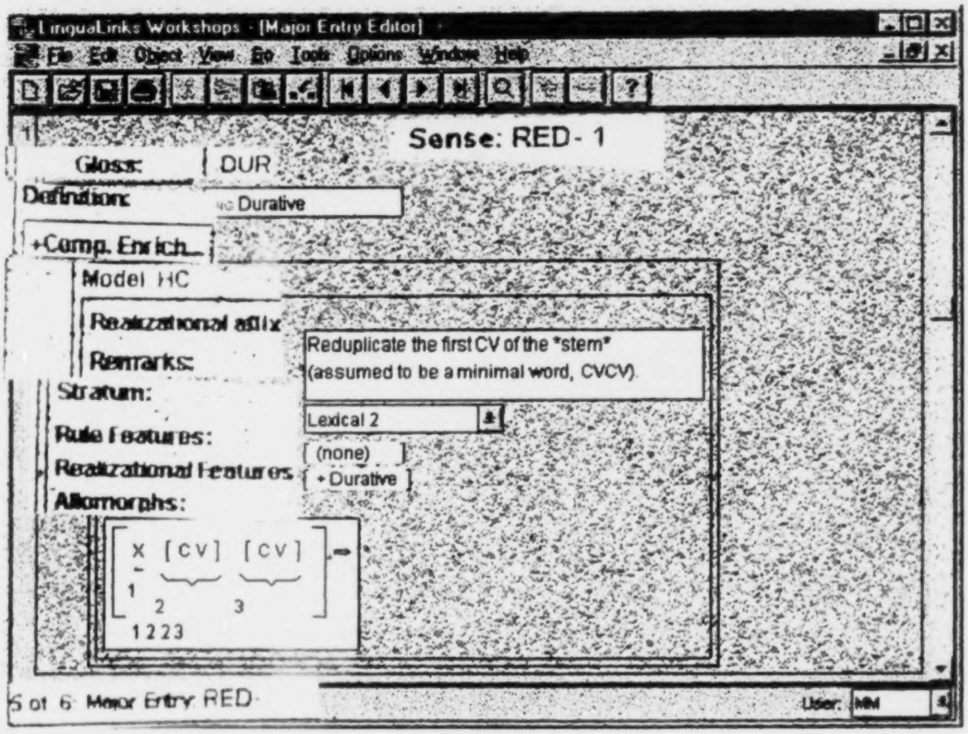
Several additional views of the mapping between phonemes and features are provided, including a table-based view to allow easy comparison of features among related sounds.

4.2 Setting up Strata. Next, the linguist would set up one or more strata to which phonological rules, affixes, and the lexical entries in the lexicon may be assigned. (The lexicon as a whole is assigned to a single stratum, but there is provision for overriding this in the case of lexical entries for unassimilated loanwords, etc.)

For each stratum, the user would also assign one of the tables relating characters to phonetic features which he created in the previous step. It is possible to use a single table for all strata, or separate tables for each stratum. The latter may be appropriate if the user wants to define special segments which are ambiguous for certain features—archiphonemes, for instance.

4.3 Setting up Affixes. Hermit Crab uses the lexical entries in the user's lexical database for affixes, roots, and stems. For roots and stems, the typical lexical entry contains all the information Hermit Crab needs. But for affixes, there is a certain amount of information which Hermit Crab needs, but which the typical lexical entry in a bilingual dictionary does not contain. This additional information is therefore stored in a 'computational enrichments' field in the lexical entry. For instance, Hermit Crab needs to know whether an affix is a derivational affix, an inflectional affix, or a realizational affix. (The distinction between realizational affixation and the traditional approach to inflectional morphology was discussed in section 2.4.) Hermit Crab also needs to know what change (if any) a derivational affix makes to the part of speech of a stem to which it attaches, as well as what morphosyntactic features a derivational or inflectional affix introduces, or what morphosyntactic features a realizational affix realizes.

Finally, Hermit Crab needs to know the phonological form of an affix. For prefixes and suffixes, Hermit Crab defaults to the assumption that the underlying form of the affix is simply the citation form, and that it attaches before (or after) the stem without changing the form of the stem itself. The user can override any of this, as well as define a process for affixes other than prefixes and suffixes; examples of more complicated morphological processes were given in section 2.1. Hermit Crab provides a structured editor, shown in Figure 2, which makes it easy (or at least easier) to define such morphological rules. The example illustrates a realizational affix, which happens to mark durative aspect in Tagalog; its phonological effect consists of reduplicating the penultimate syllable (CV) of the stem.


LinguaLinks Workshops - [Major Entry Editor]
File Edit Object View Go Tools Options Window Help
?
Model HC
Realizational affix

Sense: RED- 1

Gloss: DUR

Definition: Durative

+Comp. Enrich...

Remarks: Reduplicate the first CV of the *stem* (assumed to be a minimal word, CVCV).

Stratum: Lexical 2

Rule Features: (none)

Realizational Features: +Durative

Allomorphs:

$$\begin{bmatrix} \underset{1}{X} & \underbrace{[CV]}_{2} & \underbrace{[CV]}_{3} \end{bmatrix} \rightarrow 1223$$

5 of 6 Major Entry: RED

User: MM

Figure 2

Also shown in Figure 2 are several other features of Hermit Crab, none of which are actually used for this example. One such capability is that of defining and using 'rule features'. A rule feature is a diacritic (exception) feature; that is, a feature which is not phonetically based, but which is none the less important for the morphology (and sometimes for the phonology). For example, many languages have conjugation or declension classes, where words in each of these classes take distinct sets of affixes. The classes can be encoded by rule features which are typically assigned to stems, but in some cases are introduced by affixes (particularly derivational affixes). An affix which belonged to a particular conjugation class would then be marked in the lexicon as requiring that rule feature on a stem to which it attaches.

Another capability not used in the above example, is that of defining 'feature variables'.[21] A feature variable represents a phonetic feature, or set of

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[21] Sometimes referred to as 'alpha variables'.

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features, which are required to agree in two or more places in the rule, typically between the input and the output of the rule. For instance, in English the prefix *in-* has several allomorphs, among which are im-, in-, and iŋ- (the latter is not distinguished in the orthography, of course). The prefix *un-* does not have any such allomorphs. One way to capture the difference between these two prefixes[22] would be to assign the point of articulation features (such as coronal, back and high) to a feature variable in the *in-* prefix, such that the point of articulation features of the nasal and a stem-initial consonant were required to agree. The *un-* prefix, on the other hand, would simply attach the string *un-* to the beginning of a word, making no use of feature variables.

4.4 Creating Phonological Rules. In addition to defining affixes, the linguist will often wish to define phonological rules. While these may be allophonic rules, more typically (at least in the context of doing morphological analysis), these will be 'deeper' rules, such as morphophonemic rules.

The picture in Figure 3 shows an example of the phonological rule editor.

The rule in question assimilates a nasal consonant to the point of articulation of a following obstruent. Note the use of feature variables in this example to indicate the assimilation: the Greek letters (alpha, beta…) are used as variables of those features. Thus, the output of the rule assigns to a nasal consonant whatever value the features *coronal, back, anterior* and *high* have on the following obstruent.

Hermit Crab allows other views of such a rule. For instance, it is possible to ignore such individual features as *consonantal* and *nasal*, and to instead display just the natural classes which those features define, as shown in Figure 4.

In the view in Figure 4, the natural classes *nasal cons* and *stop* are shown in place of their component feature values. Similarly, the feature variable *consonant place* is shown. Recall that a feature variable represents one or more features which must agree wherever the feature variable appears in the rule. In this example, the linguist has defined the feature variable *consonant place* as a set of four features, namely *coronal, back, anterior* and *high*; the individual features of this set must agree in both places the feature variable appears.

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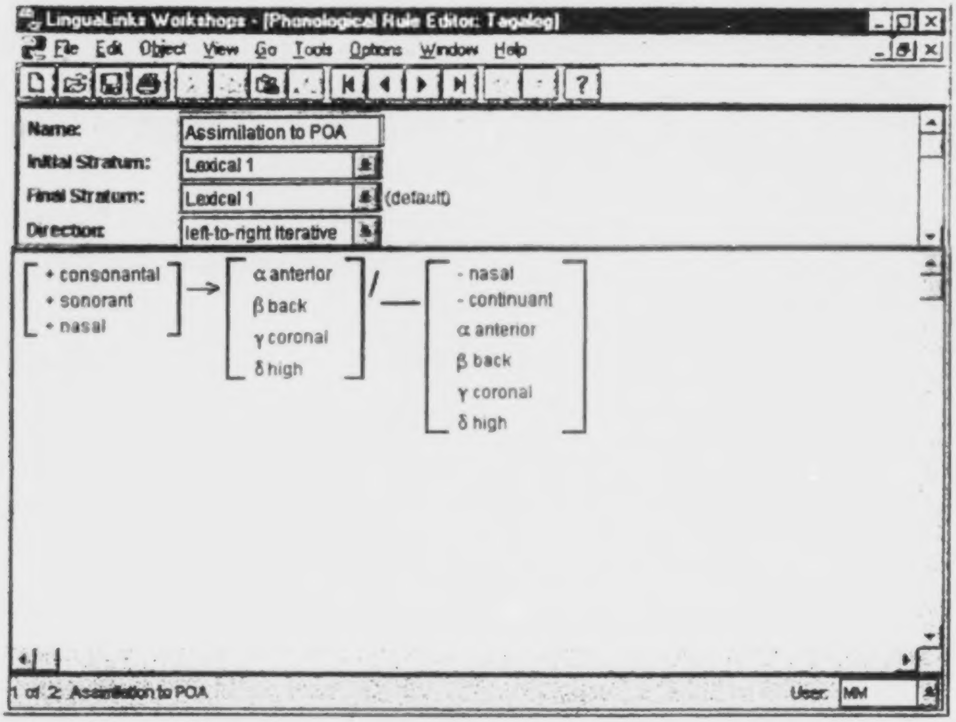
[22] Again, this example is only intended for illustration. Another, and perhaps better, way to capture this difference would be to assign *in-* to a deeper stratum, and *un-* to a shallower stratum, with a phonological rule of assimilation applying only in the deeper stratum. The rule would also need to create the other two allomorphs of *in-*, namely il- and ir-, as well as account for the default form of in- found with vowel-initial stems.


LinguaLinks Workshops - [Phonological Rule Editor: Tagalog]
File Edit Object View Go Tools Options Window Help
?

Name: Assimilation to POA

Initial Stratum: Lexical 1

Final Stratum: Lexical 1 (default)

Direction: left-to-right iterative

$$\begin{bmatrix} +\text{consonantal} \\ +\text{sonorant} \\ +\text{nasal} \end{bmatrix} \rightarrow \begin{bmatrix} \alpha\,\text{anterior} \\ \beta\,\text{back} \\ \gamma\,\text{coronal} \\ \delta\,\text{high} \end{bmatrix} / \_\_ \begin{bmatrix} -\text{nasal} \\ -\text{continuant} \\ \alpha\,\text{anterior} \\ \beta\,\text{back} \\ \gamma\,\text{coronal} \\ \delta\,\text{high} \end{bmatrix}$$

1 of 2: Assimilation to POA

User: MM

Figure 3

4.5 Debugging the Analysis. Probably every linguist who has used a computer to test a grammatical analysis has come away from the experience with a deeper understanding of the grammar. The down side of this is that no matter how long one has studied a language, one's first attempt at modeling a grammar is likely to be wrong. Grammars are more complicated than we as linguists can reason through in our heads. Accordingly, a computer grammar model must provide tools to debug the grammar. For derivational models of morphology and phonology, one such tool is a derivation tracer: a tool which shows each step in the derivation. If one is parsing complete words (surface forms) into their component morphemes (or a stem and a set of affixation processes), it is possible to trace the steps the computer went through in analyzing the word into its constituents. However, this may be more confusing than enlightening, particularly if there are numerous dead ends in analysis, or if there are ambiguities.[23] Instead, it

---

[23] Because of the nature of generative phonology, the representation of a word being parsed becomes increasingly ambiguous as a sequence of phonological rules is 'unapplied'. Hermit Crab displays these ambiguities to the user in a regular expression notation. Ambiguities of

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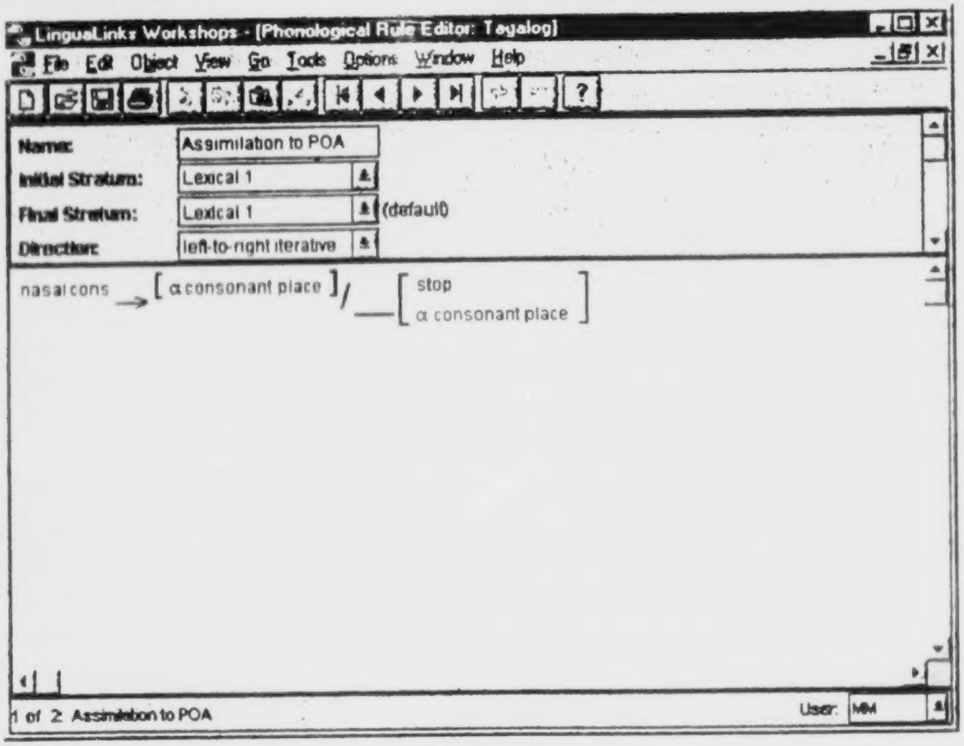
is usually easier to explore a derivation beginning with a known stem and set of affixes, since the derivation (as opposed to a parse) will be more or less unambiguous.[24]



LinguaLinks Workshops - [Phonological Rule Editor: Tagalog]

Name: Assimilation to POA
Initial Stratum: Lexical 1
Final Stratum: Lexical 1 (default)
Direction: left-to-right iterative

nasal cons → [α consonant place] / ___ [stop, α consonant place]

1 of 2 Assimilation to POA   User: MM

Figure 4

Hermit Crab allows both kinds of traces: parse traces, which begin from a surface form and show the steps followed in analyzing it; and derivation traces, which begin with a stem and affixes, and show the steps followed to yield a surface form. The following picture (Figure 5) illustrates a derivation trace produced by running Hermit Crab:

---

analysis also occur whenever an affix is removed, since the removal of an affix may be incorrect (as e.g. the removal of the affix *–ing* from the word *ring* would be incorrect). Hermit Crab shows these ambiguities as branching points in the analysis.

[24] A small amount of ambiguity may arise at intermediate steps in the derivation, if the set of features for some underinstantiated segment corresponds to more than one phoneme in the chosen encoding. This will be illustrated in the example in the text, in which the linguist has chosen to represent a Tagalog nasal consonant in an underinstantiated form.

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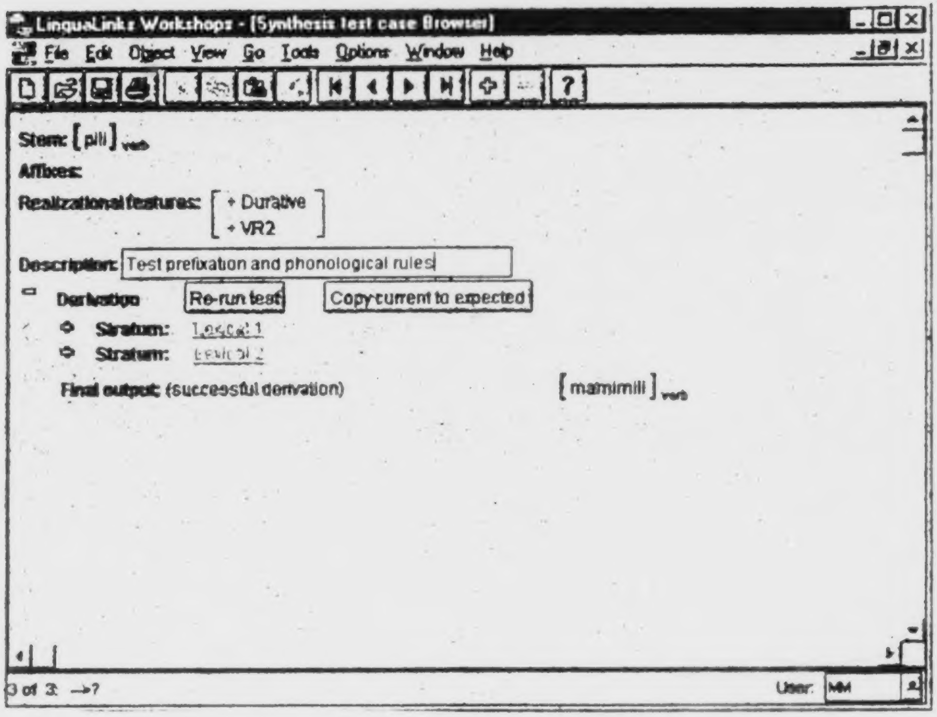
LinguaLinks Workshops - [Synthesis test case Browser]
File Edit Object View Go Tools Options Window Help
Re-run test
Copy current to expected
3 of 3: →?
User: MM

Stem: [pili]$_{verb}$

Affixes:

Realizational features: [+ Durative + VR2]

Description: Test prefixation and phonological rules

Derivation

Stratum: Lexical 1

Stratum: Lexical 2

Final output: (successful derivation) [mamimili]$_{verb}$

Figure 5

This example in Figure 5 illustrates the attachment of a two affixes to the verb stem *pili*. The derivation is shown as an outline, with certain portions of the derivation collapsed for ease of viewing. The analysis uses two strata (called 'Lexical 1' and 'Lexical 2'). The affixes to be attached are inflectional affixes, and rather than being specified explicitly, they are determined by the set of inflectional features to be realized ([+Durative +VR2]), in accordance with the theory of Realizational Morphology. (If the affixes were derivational affixes, they would be specified explicitly, and would then appear after the label 'Affixes'.) The last line shows the final output, the verb *mamimili*.

In the following screenshot (Figure 6), the user has decided to look more closely at what happens in each stratum, and has therefore slightly expanded those portions of the outline. (The user has also scrolled the display down slightly, so that what appeared near the top of the previous screen is no longer visible.) The 'Stratum input' and 'Stratum output' are now shown for each of the two strata. Because the affixes dealt with here are treated as realizational affixes, no 'ordinary' affixes are attached, hence the '(none)' after the label 'Affix applications' in each stratum. However, in the first stratum ('Lexical 1'), an inflectional affix template does apply, and this portion of the derivation is therefore represented by an outline point, here

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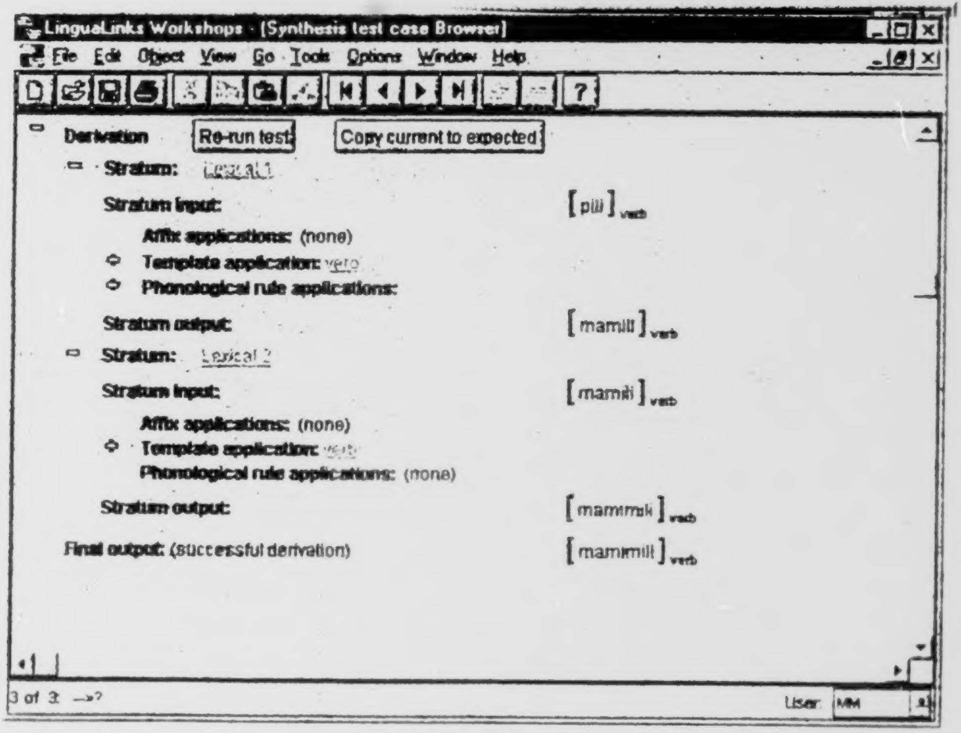
unexpanded (as indicated by the large '+' sign to the left of the label 'Template application'). Likewise, the first stratum has several phonological rules, whose application is represented by another outline point. In the second stratum ('Lexical 2'), there is another template application (represented by yet another outline point), but no phonological rules (hence the '(none)' after the label 'Phonological rule applications').

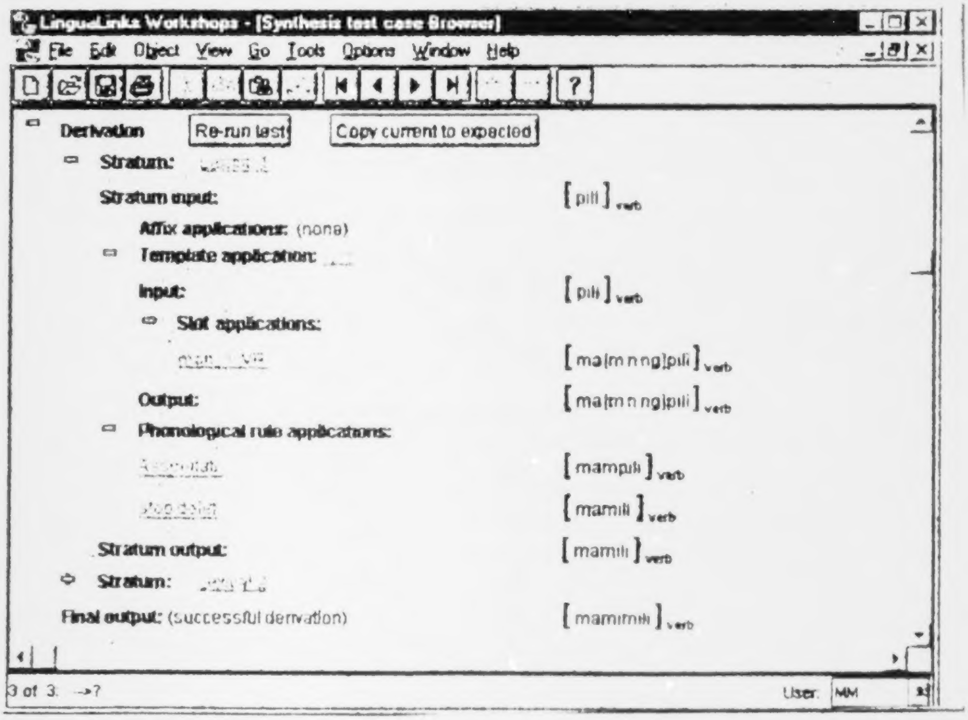

LinguaLinks Workshops - [Synthesis test case Browser]
File Edit Object View Go Tools Options Window Help
?
Re-run test
Copy current to expected
3 of 3: —»?
User: MM

```
Derivation
  Stratum: Lexical 1
    Stratum input:                                   [pili]verb
        Affix applications: (none)
        Template application: verb
        Phonological rule applications:
    Stratum output:                                  [mamili]verb
  Stratum: Lexical 2
    Stratum input:                                   [mamili]verb
        Affix applications: (none)
        Template application: verb
        Phonological rule applications: (none)
    Stratum output:                                  [mamimili]verb
Final output: (successful derivation)                [mamimili]verb
```

Figure 6

In Figure 7, below, the user has opened the two outline points in the first stratum to show the application of that stratum's affix template and phonological rules.

For the template application, the input and output of the template are shown, between which appears the application of the slots of the template. (In this example, there is only one such slot.) The attachment of the prefix *maN-* has been triggered by the feature [+VR2]. The form of this prefix is represented in the morphological rule of its lexical entry as *ma* followed by a nasal consonant with an unspecified point of articulation. There are three nasal consonants in the Tagalog encoding used here: *m*, *n*, and *ng*. Since a nasal consonant with an unknown point of articulation could correspond to any of these, Hermit Crab represents the ambiguity as a list of the three possibilities, enclosed in square brackets: *[m n ng]*. Thus, the output of the affixation process, as well as that of the template as a whole, is given as *ma[m n ng]pili*. The ambiguity is only resolved by the application of the phonological rule of 'assimilation' (the rule shown earlier in this article; note that the rule name is truncated to 'Assimilati' in the picture), as shown under the 'Phonological rule applications' in the screenshot. This rule assimilates the nasal consonant to the point of articulation of the following *p*, thereby resolving the ambiguity, and giving as output the form *mampili*. The application of the other phonological rule of this stratum, 'stop deletion', deletes the *p*, resulting in the final stratum output *mamili*.


LinguaLinks Workshops - [Synthesis test case Browser]
File Edit Object View Go Tools Options Window Help
?
Re-run test
Copy current to expected
3 of 3: →?
User: MM

```
Derivation
  Stratum:
  Stratum input:                              [pili]verb
      Affix applications: (none)
      Template application:
      Input:                                  [pili]verb
        Slot applications:
                                              [ma[m n ng]pili]verb
      Output:                                 [ma[m n ng]pili]verb
      Phonological rule applications:
                                              [mampili]verb
                                              [mamili]verb
  Stratum output:                             [mamili]verb
  Stratum:
Final output: (successful derivation)         [mamimili]verb
```

Figure 7

In the second stratum, another realizationally-triggered affix applies to give the final output *mamimili*. The details of the application of the second stratum are not shown here, but would be revealed by expanding the outline point for that stratum.

Had there been an error in the above derivation, in the sense that the final output was not the expected form, the linguist could locate the problem by examining such a derivation trace. If the problem is that an affix or a phonological rule did not apply as desired, the editor for the particular affix or rule can be immediately called up by clicking on the underlined names of the phonological rule or affixes, which thus function as a sort of hypertext link to the appropriate editing tool.

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Alternatively, if the problem were that a rule needed to be added, or the order of the rules needed to be changed, then the user can bring up the editor for the overall analysis and either add a rule or re-order the existing rules. The tool for doing this is shown in Figure 8:

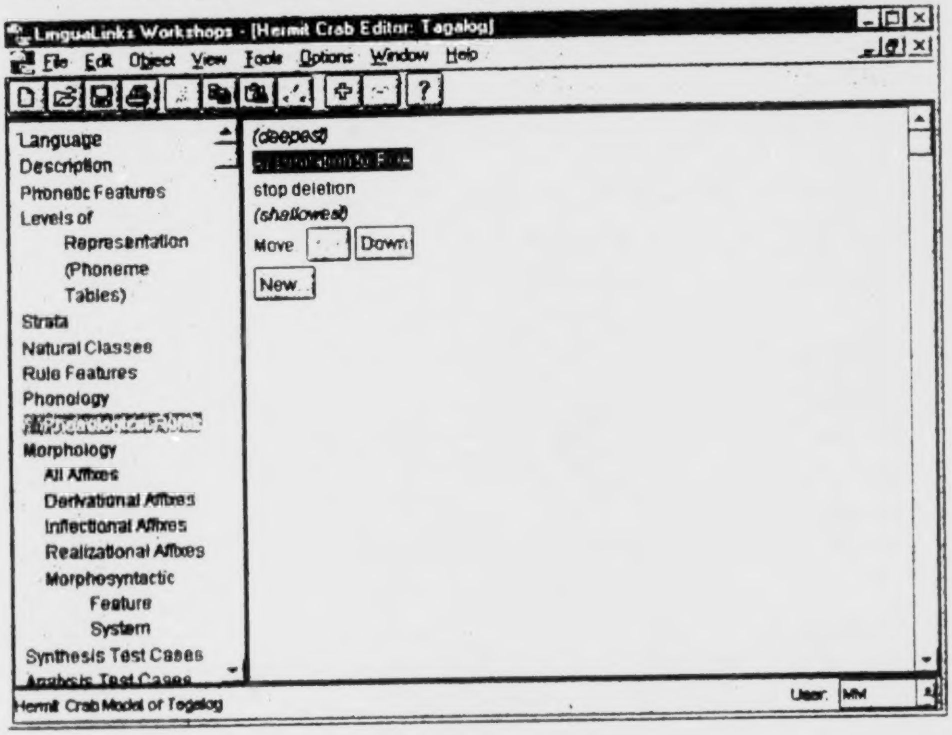
LinguaLinks Workshops - [Hermit Crab Editor: Tagalog]
File Edit Object View Tools Options Window Help
?
Language
Description
Phonetic Features
Levels of
Representation
(Phoneme
Tables)
Strata
Natural Classes
Rule Features
Phonology
Morphology
All Affixes
Derivational Affixes
Inflectional Affixes
Realizational Affixes
Morphosyntactic
Feature
System
Synthesis Test Cases
Analysis Test Cases
(deepest)
stop deletion
(shallowest)
Move
Down
New...
Hermit Crab Model of Tagalog
User:
MM

Figure 8

In this editor, the user has clicked in the left-hand pane on the topic 'Phonological Rules', and the right-hand pane displays the list of rules the linguist has defined for Tagalog.[25] In the right-hand pane, the rule that applies first in derivation order ('Assimilation to POA') is shown at the top, and the rule which applies last ('stop deletion') is shown at the bottom. The user has selected the first rule, which can be re-ordered in the list of rules by clicking on the 'Down' button (since the first rule can't be any higher in the derivation order than it already is, the 'Up' button is grayed out). Clicking on the 'New...' button would insert a new rule after the selected one, and launch an editor for it.

---

[25] The use of a left-hand pane to list the sorts of information which may be displayed, and the right-hand pane to display the currently selected class of information, resembles many Internet browsers. I am indebted to John Hatton and Randy Regnier for the idea and much of the code of this tool, as well as several other usability enhancements.

Hermit Crab is an interactive system, not a batch system (although it can be run in batch mode, for instance in processing ‘ptext’, as described in section 6). The fact that it runs in interactive mode means that the linguist can make most changes to the grammar without stopping to reload the grammar. For instance, modifications to a phonological rule, reordering of rules, and changes to lexical entries are made to the running system as soon as the user makes a change in an editor. The interactive nature of such changes is only blocked if the user changes something which requires reloading the entire grammar and lexicon. For instance, a change to the features assigned to a phoneme, or a change to the phonetic feature system itself, will require reloading the entire lexicon (because the lexical entries are stored internally to Hermit Crab in a feature-based representation, not a character representation). When changes are made that require reloading the entire grammar into Hermit Crab (a process which can take several minutes if the dictionary is large), the system so notifies the user. If the user elects to go ahead with the change, the grammar is unloaded from Hermit Crab, and the user can reload it after completing in LinguaLinks whatever edits are required.

Context sensitive help is available everywhere in Hermit Crab (and elsewhere in LinguaLinks), using the ‘Help’ menu at the top of the screen, or by right-clicking on an object and choosing the ‘Help’ item from the pop-up menu.

4.6 Sliding Scale Morphology. At first glance, using Hermit Crab to do morphological analysis might seem a daunting task. The use of feature-based phonological rules to derive allomorphy is not something with which many—perhaps most—field linguists are comfortable. Nor is classical generative phonology taught today as a viable linguistic theory. How does the linguist start out using Hermit Crab, if he is not already comfortable with these approaches?

The general problem of creating a morphological analysis from scratch has been a topic of discussion over the last year or so among linguists and linguistic programmers in SIL. The terms ‘Sliding Scale Morphology’ and ‘Stealth-to-wealth parsing’ have been used to refer to the notion of a parsing system which is useful starting from the stage at which the field linguist knows very little about the morphology (or syntax) of a language, and which grows in its capability as the linguist’s understanding of the language being analyzed grows. The idea, then, is:

- to make it easy for the linguist to begin using a parser;
- to make it easy for the linguist to fill in details of the grammar analysis as he comes to understand the language better; and

- to encourage the linguist to add depth to the analysis in order to avoid such tedious tasks as manual disambiguation.

The last point may require some clarification. Consider a field linguist who is analyzing a previously unstudied language, English. The linguist would observe that there are three homophonous suffixes *–s*: one marking the plural on nouns, one marking the third person singular on verbs, and another suffix[26] marking possessives. Suppose the user has not yet indicated which part of speech each of these suffixes attaches to. Each time the parser finds a word in interlinear text which can be analyzed as a stem + *s*, it will present the user with three analyses, one for each suffix. Eventually the user will grow tired of doing manual disambiguation. At this point, either the program becomes too cumbersome to use, or it provides the user with an easy way to automate the disambiguation. Suppose the user is looking at the word *speaks*. The plural and possessive parses are impossible, the user realizes, because *speak* is a verb, while the plural and possessive suffixes attach only to nouns.[27] The user therefore tells the computer this, with the result that (1) the grammar has become more accurate, and (2) disambiguation has become more automatic. This simple example glosses over a number of issues, but suffices to give an idea of how a grammar development system can encourage the user to improve the accuracy and depth of an analysis.

While acting as such a 'sliding scale' morphological analyzer was not one of Hermit Crab's original design goals, it is of interest to see to what extent this notion is supported in the current system.

The first step in using Hermit Crab is to choose a phonetic feature system for the phonemes of the language, as these are represented in whatever orthography the user has chosen. This requires the user to create a table of all the phonemes, and to distinguish each of them using the feature system.[28] Several feature systems are supplied with Hermit Crab, so this step is mainly a case of choosing one of these feature systems, and then deciding whether a particular phoneme is voiced, consonantal, strident, etc. If the user is unsure of the meaning of a particular feature, on-line definitions are available.

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[26] The possessive is actually a clitic, but I will ignore this subtlety here.

[27] Since the possessive is a clitic, it can actually attach to verbs as well, as in *the person who speak's idea*, but this is rare. For the sake of exposition, I will assume such cases are unimportant.

[28] Most orthographic representations distinguish upper and lower case letters. Since such case distinctions are irrelevant to Hermit Crab, it is possible to use only lower case letters in defining the phonemes, and 'transduce' the upper/lower case orthography into a lower case only orthography using the built-in 'transduced font' capabilities of LinguaLinks. This is usually sufficient for interlinear glossing, but a more sophisticated method will be necessary for CARLA purposes.

Hermit Crab initially assumes a single stratum, to which all lexical entries in the lexicon belong. As the user discovers prefixes and suffixes, these are automatically loaded into Hermit Crab, along with stems and roots; most of these will be supplied in the early stages of analysis from the user's hand-glossed interlinear texts. At present, Hermit Crab requires the user to tell it what category of stem each affix attaches to, but this restriction could be relaxed to allow attachment to a stem of any category.

In languages which have long sequences of inflectional affixes, the affixes typically attach in a fixed order. (The same cannot be said for derivational affixes, whose order may instead be dependent on the category of the stem to which they attach, to the stratum to which they belong, or to their scope with respect to other affixes.) Likewise, certain sets of inflectional affixes may be mutually exclusive (affixes marking person/number of the subject, for instance: a verb cannot take both a first person subject affix and third person subject affix at the same time). The use of templates to define slots of mutually exclusive affixes, and the order in which these slots attach to a stem, was discussed in section 2.4, and defining such templates is quite easy.[29] However, in order to distinguish among the affixes of a given slot, Hermit Crab requires the use of morphosyntactic features, which some linguists may be uncomfortable with. At the moment, making it easier to discover what morphosyntactic features are relevant to a particular language's inflectional morphology is a matter for research. Also, Hermit Crab does not presently have an across-the-board method to change from a traditional view of inflectional affixes (using feature percolation) to a realizational view of inflection, but such a method could be programmed in.

Accounting for allomorphy is another task which becomes necessary in most languages. When the linguist tackles allomorphy, there are two directions which could be taken initially: either write allomorphy rules for each affix exhibiting allomorphy, or choose underlying forms for each such affix and write phonological (morphophonemic) rules to derive the allomorphs. Most field linguists will doubtless choose the former path, since it will usually be easier at first to define the conditioning environments for each morpheme individually than to generalize across all morphemes and their allomorphs. Thus the user will write phonological constraints on the environments in which each allomorph attaches, using the notation shown in section 2.1. The user can also encode in such allomorphy rules any changes which attachment of an affix causes to the stem. While this is not simple, it is hard to see how it could be much simpler; and the linguist who wishes to postpone writing generative phonological rules (and determining their order of application) can do so.

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[29] However, it would be easier if there were an automated way to determine the minimal number of slots, and the affixes which belonged to each slot. The PARADIGM program (Grimes 1983) provided that capability, and it should be possible to code the algorithm described there into a morphology workbench.

Finally, the linguist may be faced with non-concatenative affixes, particularly infixes or affixes of reduplication. While there can be complications, the typical situation is that such affixes are fairly straightforward: an infix is attached after the first consonant or before the last consonant, etc.; a reduplicant often consists of a CV or a CVC copied from the adjacent part of the stem, or a fixed phoneme plus a copy of part of the stem. At least with these simple kinds of non-concatenative morphology, the rules are not too complicated to write. (See for instance the example of a reduplicative prefix in section 2.1.) If there are variants—prefix something to a vowel-initial stem, but infix it to a consonant-initial stem, for instance—these are readily handled by the same sorts of allomorphy rules discussed in the previous paragraph, or they can often be treated by making part of the morphological rule's input template optional.

In summary, while it cannot be said that building a morphological grammar with Hermit Crab is simple, the process may not be as daunting as it at first appears, and it may well turn out to be simpler (and more linguistically satisfying) than analyzing morphology with other computational systems. Moreover, there is an 'upgrade' path: if the linguist finds he has written identical allomorphy rules for a number of different affixes, it is possible to replace those allomorphy rules with single underlying forms and one (or more) general phonological rules.

5 Limitations of Hermit Crab. Many of the limitations of Hermit Crab have been described in sections 2 and 3. Perhaps the most important of these is the fact that Hermit Crab cannot do autosegmental phonology, nor does it have any concept of metrical structure. Both autosegmental and metrical phonology are possible future enhancements, although it may turn out to be difficult to implement a parsing algorithm for these theories. (Generation using autosegmental and metrical phonology, that is going from an underlying form to a surface form similar to what STAMP does, would not be too difficult.)

In the area of morphology, Hermit Crab's morphosyntactic features are flat: there is no provision for one feature having another feature as its value. This may be a limitation for languages in which verbs agree with both their subject and their object. What one would like to do in such a case is to have a morphosyntactic feature structure like the following:

$$\begin{bmatrix} \text{Subject} & [\text{person } 1 \\ & \;\text{number PL}] \\ \text{Object} & [\text{person } 2 \\ & \;\text{number SG}] \end{bmatrix}$$

A work-around here would be to have features like this:

$$\begin{bmatrix} \text{subject\_person} & 1 \\ \text{subject\_number} & \text{PL} \\ \text{object\_person} & 2 \\ \text{object\_number} & \text{SG} \end{bmatrix}$$

Hierarchical morphosyntactic features will probably be a future enhancement.

Compounding and incorporation has not been implemented, but would not require much additional programming.

Cyclic rule application is not currently supported, but would be simple to implement (although it would slow down the parsing process when used). Implementing strict cyclicity might be more difficult, as this constraint was never completely formalized (Cole 1995, Mohanan 1995).

The speed of the parsing algorithm is probably not an issue, at least with the current system. The actual parsing of a word takes on the order of one tenth to several tenths of a second on an 80486/66 running under Microsoft Windows, depending on the number of lexical entries for stems, and the number of affixes and phonological rules. If tracing is turned on, parsing is slowed down somewhat, although typical times are still under a second. However, this speed is not always apparent to the user, as the user interface takes significantly longer to interpret and display the results: on the order of several seconds, or as much as ten or twenty seconds if tracing is turned on (these times are on a Pentium-class processor). The user interface speeds may be significantly improved if Hermit Crab is ported to the Santa Fe system, as described in the next section.

Finally, Hermit Crab should be considered an experimental system at this point. While I have tested it on a typologically wide variety of language data, I am painfully aware of the fact that bugs are still lurking, waiting to trip up users. Anyone planning to use Hermit Crab should check with me (Mike_Maxwell@sil.org) or the LinguaLinks development team (Academic Computing) for any patches which may be available.

6. Future Directions. Priorities in the further development of Hermit Crab depend on the development of a user community. Overcoming some of the limitations discussed in the previous section would be high on the list of things to do: hierarchical morphosyntactic features, compounding and incorporation, and autosegmental and metrical phonology are all possible enhancements (with autosegmental phonology being the most difficult).

At present, Hermit Crab cannot use or produce 'ptext', which is a file format intended for easy transfer among CARLA programs (Simons 1996). Modifying Hermit Crab to produce ptext would not be difficult; modifying Hermit Crab to use ptext files produced by AMPLE might be more difficult, because of the radically different concepts of morphology these two programs represent. (For instance, AMPLE produces a left-to-right morphological analysis, while Hermit Crab expects an 'inside-out' analysis, i.e. an analysis which begins with the root or stem, regardless of the existence of prefixes.)

Software development in SIL's Academic Computing department is now targeted at the development of the Santa Fe suite of programs, rather than at LinguaLinks as it currently exists. Porting Hermit Crab to the Santa Fe suite will require reprogramming Hermit Crab's user interface, which would take time, but would also offer a number of advantages. Not the least of these is speed, since it would probably be possible to avoid the translation between the parser's output and LinguaLinks. This translation involves converting Hermit Crab's internal structures into text, and then parsing the text representations into the different structures used in LinguaLinks. This translation phase is the biggest bottleneck in the process at present.

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REPORT on LinguaLinks CD-ROM: Field Guide to Recording Language Data

by Charles F. Grimes

Paul Frank
SIL—Colombia Branch

The *Field Guide to Recording Language Data* by Charles F. Grimes (hereafter FGRLD) is primarily oriented toward the effective use of the cassette recorder in linguistic research but also covers a broad range of related issues. FGRLD was first published by SIL in Australia in 1992 and has been subsequently incorporated (without modifications) into the SIL LinguaLinks Linguistics Bookshelf [a CD-ROM collection of software tools and linguistic task helps put out by SIL that assist the user in collecting, organizing, analyzing and managing linguistic data.]

The seven chapters in FGRLD are:

1) Introduction
2) Selecting equipment
3) Recording text
4) Maintaining the equipment
5) Making a copy (dubbing)
6) Alternate means of recording text material
7) Ethical issues in test collection

FGRLD is practical and clearly written. The vocabulary is basic enough to make it usable by non-native English speakers apart from a few strong colloquialisms (e.g., a reference to languages with 'hairy phonetics'). Little prior knowledge is assumed and technical terms are sometimes defined (e.g., 'A jack is a hole into which you insert a plug'). Grimes has provided not only facts but also many recommendations to guide the researcher in the selection of appropriate equipment and its proper use.

FGRLD should be required reading for all field methods students and has a place in the personal reference library for all field workers. The only suggestion I would make regarding FGRLD is that it should be revised or supplemented by information about how to use digital recording technologies now available and which are becoming increasingly more common. Hand-held digital recorders such as the Sony MZ-R30 and analog-digital/digital-analog converters now used in desktop and laptop computers have put digital recording at the disposal of field linguists. Such tools can now be used either for original recording or for subsequent conversion to digital form of language data originally recorded on cassette. Though cassette recorders will no doubt continue to be used for many years to come, an increasing amount of language data will soon be recorded digitally at the time when it is first gathered.

After a short introduction, FGRLD moves on to cover the selection of equipment in chapter 2. Grimes summarizes the various kinds of recorders available (reel to reel, cassette, mini-cassette, and micro-cassette) and clearly recommends a good quality cassette recorder which is not too large or heavy. He does not make recommendations regarding brands or models, but does cover in some detail the various features of a recorder and what to look for. He discusses controls, speaker, input and output jacks, footage counter, VU meter, etc. Grimes notes a few features to avoid (or at least not use) such as voice activation and long-play recording speeds. The section on microphones makes the important observation that 'the type and quality of microphone can be more important than the quality of the recorder for making a good recording.' This section covers directionality of microphones, methods of positioning microphones, and microphone technologies. Discussions of cassette types, power sources and other common accessories such as patch cords and headphones round out this chapter.

Chapter 3 'Recording Text' contains information which every field linguist should master. Many avoidable problems result from a failure to follow basic principles described in this chapter. Some issues are technical in nature such as setting up and testing your equipment for each use, microphone placement, and making the actual recording. Grimes also deals with the human element of minimizing anxiety in the narrator and making the recording setup as unobtrusive as possible. He even includes advice about how to cope with the presence of drums which make recording difficult when they accompany singing—a situation I have never encountered.

Chapter 4 deals with maintenance of equipment, including preventative maintenance, routine maintenance and emergency repairs. Specific topics are: means of protecting equipment from the elements, cleaning of the recorder's heads, proper use and care of batteries, care and repair of cassette tapes (including splicing), erasing, and copying. The discussion of tape copying notes good reasons to make copies of tapes (for backup and every few years to prevent 'print-through') but fails to note that copies will be lower in quality and that the degradation in quality will be noticeable after several generations of copying. Digitizing material originally recorded on cassette and storing on compact discs would be much preferable for data preservation. Computers with sound cards, simple audio editing software, and a CD writer can be used to make digital copies of audio materials in a straightforward process. Once in digital form, successive copies can be made with no loss in quality.

Chapter 5 covers alternate means of recording text material. Two methods discussed are transcribing onto paper directly and recording the event on video or film. This chapter could be easily updated to include a discussion of digital recording options such as the Sony MZ-R30 portable digital recorder and the use of a laptop computer with a built in sound card. The Sony MZ-R30 uses a minidisc to store up to 74 minutes of stereo data or 148 minutes of mono data, weighs 10 oz., and is slightly smaller than a Walkman-type cassette player.

The final chapter 'Ethical issues in text collection' covers topics which should not be ignored by the field researcher: clearly communicating the purpose of the research, ensuring voluntary participation, and protecting the anonymity of participants when required. This discussion is quite different from the practical tips and technical information in the rest of the book, but we need to never forget that the people whose voices we record deserve to be treated with dignity and not just as sources of language data.

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HELP NEEDED TO DEVELOP LINGUISTICS BOOKSHELF

The SIL International Linguistics Department is looking for help in developing the *Linguistics Bookshelf* which is part of the LinguaLinks CD-Rom. Help is needed from linguistics consultants or people who have recently done linguistic research. If you have a module that you think could be further developed, or you feel there is something new you could contribute, please send your suggestion to paul_thomas@sil.org. To name a few areas where we would like to enhance the Bookshelf: field methodolgy such as procedures for obtaining and analyzing discourse data, notes on consulting, sketches of language families.

Reviews

Intonation (Second Edition). By ALAN CRUTTENDEN. New York: Cambridge University Press. 1997. 201 pp. Hardback $59.95, paper $22.95, cassette $22.50.

Reviewed by JOAN BAART
SIL—West Eurasia Group

This is an updated and somewhat expanded edition of Cruttenden's textbook on intonation, first published in 1986. Twelve years after its first publication, this book is still the only one of its kind, and the recommended reference for any non-specialist wishing to know more about intonation.

One of the strengths of this book (in particular for the field linguist) is that it is not restricted to the intonation of English. It includes observations on the intonation of over thirty different languages—about half of them being non-European. Still, by far the majority of examples in the book are from English, which is a reflection of the fact that so much more work has been done on the intonation of English than of any other language. The book also reviews the different frameworks of intonation analysis in the literature, and defends (without ever getting dogmatic) the tradition within which the author himself works, which is the British 'nuclear tone approach'. The book contains helpful suggestions for the field linguist; some of these concern procedures for analysing the forms of intonation, and others relate to possible 'meanings' that can be ascribed to these forms. (As an aside, it should be noted that intonation—and hence this book—is relevant to both tone and non-tone languages, although tone languages employ a smaller set of intonational features than most non-tone languages.)

Chapter 1 (Preliminaries) and chapter 2 (Stress, accent, and rhythm) both deal with preliminary concepts, while the core of the book's contents is presented in chapters 3 (The forms of intonation) and 4 (The functions of intonation). Within the author's framework, intonation is broken down into three parts: intonational phrasing, nucleus placement, and the selection of the nuclear tone. Intonational phrasing is concerned with the segmentation of speech into INTONATION-GROUPS (called 'intonational phrases' in some other frameworks). Intonation-group boundaries are established on the basis of phonetic evidence (pause, lengthening of the final syllable, declination reset, etc.), along with considerations concerning the possible internal structure of an intonation-group (one requirement for an intonation-group is that it must include at least one accented syllable).

Within an intonation-group, one accented syllable can normally be singled out as being the most prominent one; this is called the 'nucleus'. It is usually the last accented syllable in the intonation-group. The nucleus, as well as other accented syllables, are marked by a conspicuous pitch change (pitch rising or falling onto the accented syllable, or away from the accented syllable). The placement of the nucleus on one or another word within the intonation-group is important for determining 'focus' (the marking of new or important information).

The pitch contour that starts on the nuclear syllable and continues until the end of the intonation-group is called the NUCLEAR TONE. In English this can be a falling pitch on the nucleus followed by low pitch continuing until the end of the intonation-group. Alternatively it can be a falling pitch on the nucleus, followed by low pitch, followed by a rising pitch on the last syllable before the boundary. There are several other possible nuclear tones in English, as well. The task of the analyst here is to determine the inventory of contrastive nuclear tones of a language.

As far as the functions of intonation are concerned, the book gives interesting observations regarding correlations between intonation-groups and syntactic constituents, and also about factors that influence nucleus placement. Most attention, however, is given to the MEANINGS of nuclear tones. A useful distinction is made between LOCAL meanings on the one hand, which are concrete and specific and are the result of the interaction of intonation and the linguistic and extra-linguistic context, and ABSTRACT meanings on the other hand, which are the meanings that can be ascribed to nuclear tones in abstraction from specific contexts.

After the reader has worked through chapters 3 and 4, chapter 5 (Comparative intonation) comes as a most enjoyable reward. All kinds of interesting facts about the intonation of English dialects, the intonation of other languages, intonational change, and children's acquisition of intonation are presented here. In this chapter, an extensive section on the typology of nuclear tones starts out with a statement of the author's belief that 'the final pitch movement following the nucleus is the most important pitch movement in an intonation-group', and that 'on this basis one may make wider and more valuable functional generalisations (149). The discussion that follows culminates in the observation that there are 'near-universal differences between the use of 'falling tones on the one hand and the use of rising tones on the other' (163). Labels often given to the usage of falling tones include: 'neutral statement', 'sentence-final', 'neutral question-word question', 'command'. Labels given to the usage of rising tones include: 'implicational or tentative statement', 'sentence non-final', 'sympathetic question-word question', 'request'. C suggests the cover term CLOSED for the meanings associated with falling tones, and OPEN for those associated with rising tones. A counter-example that comes to mind is the extensive use of rising tones with CLOSED meanings in many cities of northern Britain. At this point in the book, however, the author has already argued that these 'rises are really in some sense falls (135)!' I.e. they are basically falls that have undergone a type of diachronic phonetic change ('peak spreading').

The final chapter (Conspectus) briefly discusses a number of related phenomena (paralinguistic effects, gesture, orthography), and reviews in a page and a half the current state of the art in intonation research, suggesting that while good progress has been made in the study of phonetic detail, the study of the semantics of intonation needs much more attention.

It may be a disappointment for users of CECIL and similar computer programs, that this book has very little to say about the application of instrumental analysis to intonation studies. One page in chapter 1 is devoted to a discussion of AUDITORY (bare ears) vs. INSTRUMENTAL approaches. It concludes that both should, ideally, be combined, but the author's preference as apparent from the rest of the book is clearly an auditory one. In fact, the opposition AUDITORY VS. INSTRUMENTAL might be called a false dichotomy, as it excludes a third option that has been developed by experimental phoneticians since the 1960s, namely a PERCEPTUAL approach (see e.g. 't Hart, Collier and Cohen 1990). This approach uses native-speaker judgments of synthetic speech to distinguish between what is perceptually relevant and irrelevant information in pitch graphs. The technology needed for this type of approach has so far been out of reach for many field linguists, but that should change soon given the current capabilities of personal computers. (Manipulation of pitch is a feature to be included in a future version of the Speech Tools package under development at JAARS.)

One thing that struck me in C's bibliography is that SIL (with its exposure to a wide range of non-European languages) seems to have contributed relatively little to the study of intonation. Dr. Pike pioneered what must have been one of the first in-depth, modern-linguistic studies of English intonation (Pike 1945), a work that continues to be cited. Other than Pike's, I did not recognize any SIL work among the 356 titles in C's bibliography, with the notable exception of an article by Dorothy Thomas (1975).

One may wonder to what extent C has missed or ignored published work by SIL. A search on the keyword INTONATION in the on-line SIL bibliography revealed a total of 39 items. Of these, nine are reviews of Pike (1945), and twelve are works of Ken Pike, Evelyn Pike, and Eunice Pike, including Pike (1945). Of the remaining eighteen titles, a majority seem to be primarily about tone, discussing intonation mainly for the reason that it may cause perturbations of lexical tones. In addition to Thomas (1975), I was able to identify Pence (1964) and Larsen and Pike (1949) as good descriptions by SIL members of the forms and functions of intonation in one or another language. I may have missed a few others that are not included in the SIL bibliography or that were not available to me. At any rate, it seems to be the case that apart from the Pikes' contributions, the harvest of SIL studies on intonation has been meager indeed.

This conclusion is surprising: as SIL field linguists we try to learn to speak the languages that we study, and intonation is an important aspect of the pronunciation of a language. Secondly, intonation interacts with grammar and lexicon in producing discoursal meanings. In fact, studies of the use of grammatical and lexical discourse devices may be misleading if intonation is not taken into account. One would expect, then, that intonation is not that much near the edge of language that we can easily ignore it. So, if we are not contributing to the database of useful descriptions of intonation, let alone to the theoretical discussion, then that is a reason for some concern.

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Syntax: A minimalist introduction. By ANDREW RADFORD.
New York: Cambridge University Press. 1997. 294 pp.
Hardback $54.95, paper $16.95.

Reviewed by DONALD G. FRANTZ
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If one is looking for an understandable introduction to Chomsky's current work, it is here. Unlike other works on the subject, it is not full of the frustrating references to alternative hypotheses which leave the reader unsure which version of a module of the theory the author is following, or which of two or three competing hypotheses is to be assumed correct throughout the remainder of the exposition. This is not to say that there are no references to competing analyses and alternative proposals by those working within the minimalist program (especially in the last chapter), but these do not get in the way of an understanding of the goals of the program or the theoretical constructs and formalism. As one who has periodically made largely unsuccessful attempts at understanding the Government and Binding (GB) and Principles and Parameters (P&P) frameworks, I am very pleased with this book. For the first time I actually feel I understand most of the concepts and commonly accepted constraints of the current theory. This does not, of course, mean that I would be able to work within the framework without considerable guidance, but it does mean I can read current work with understanding.

This book is actually an abridged version of a longer textbook by the same author and publisher, titled *Syntactic theory and the structure of English: A minimalist approach* (Radford 1997). (I would have expected to find this book in the list of References, but it does not appear there nor anywhere else in the book. [Editor's note: this work is reviewed in this issue of *Notes on Linguistics* pp. 56-58.]) This shorter version was published to meet the need for a text which one can get through in a single semester or quarter syntax course. In addition to the clarity of presentation, the book benefits from excellent summaries of the key concepts and arguments at the end of each chapter. There are exercises at the end of each chapter as well; and unlike most texts, there are hints and 'model answers' to selected exercises. I would expect this book to serve its primary purpose as a textbook admirably.

As for content, the book begins with the obligatory discussion of levels of adequacy in a grammatical description, learnability and the innateness hypothesis; gives brief evidence for the 'structure dependence principle' (that all grammatical operations are sensitive to grammatical structure); and introduces three of the major parameters along which languages differ: the 'wh-parameter', the 'null subject parameter', and the 'head parameter'. All of this is in the first chapter. The remaining chapter titles show the progression: 2 Categories, 3 Structure, 4 Empty categories, 5 Head movement, 6 Operator movement, 7 Subjects, 8 A movement, 9 VP shells, 10 Agreement projections.

Readers familiar with more classical transformational grammar will find that the newer theory is different in many ways. The first thing that a reader will notice is in chapter 3, where tree structures are formed, not from the top down by phrase structure rules, but from the bottom up by merger operations which combine two categories together to form a 'larger' category. Whether or not a series of mergers results in a grammatical structure is determined by whether the head, complement, and specifier features of each lexical item are satisfied within the structure when they are 'checked' ('checking theory'). Thus recent theory has responded to earlier observations that the same constraints captured by PS rules were also included in the enriched lexicon. In later chapters we learn that many of the movement operations such as raising and passivization (there no longer are rules which deserve the label 'transformations') exist to 'save' structures that would otherwise fail the checking operation. Where and how far an item moves is determined by various universal constraints such as the head movement constraint, the shortest movement principle, and constraints of subtheories such as the theta-criterion or conditions on binding.

One thing that has not changed in the theory is that all syntactic facts must be captured in terms of tree structures. For example, the linear order of all elements must be determined within the tree structure, despite the gains some other frameworks have made by separating constituent relations and linear ordering constraints, stating linearization constraints in terms of constituents where that is correct, but not requiring that that be the only determining factor. It seems to me that the proliferation of syntactic categories in the framework are partly a result of requiring that linear order of the elements of a sentence be identical to the left to right order of the leaves of the tree representing the structure of that sentence. Another factor that has increased the number of categories is the way that agreement is accounted for (chapter 10). (It has taken a long time for Chomsky and some of his colleagues to take into account languages which show agreement with two and even three arguments, and I am happy to see that R tackles the mechanisms for this even though he otherwise draws all of his examples from English.).

I conclude as I began, recommending this book highly. R has done an admirable job of presenting the essentials of a rapidly changing framework without allowing himself to get bogged down in controversial details that would hinder the goals of the book.

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Rethinking linguistic relativity. By JOHN J. GUMPERZ AND STEPHEN C. LEVINSON, eds. New York: Cambridge University Press. 1996. Pp. viii, 488. Hardback $74.95, paper $28.95.

Reviewed by CHARLES PECK
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When learning a new language and new customs in a foreign country, one may feel that the structure of the language has somehow conditioned the ways the speakers think. It is usually difficult to say, however, just what in the language has affected what in their thinking patterns.

The ideas of linguistic relativity go back to Gottfried Wilhelm Leibnitz (1646-1716) and even farther back into intellectual history. The next landmark scholar was Wilhelm van Humbolt (1767-1835). In the present century, Benjamin Lee Whorf (1897-1941) gave the strongest statement of linguistic relativity (the strongest presentation being: *Language, thought and reality: Selected writings of Benjamin Lee Whorf*, J. B. Carroll, ed. 1956. MIT Press). Several other twentieth century linguists (notably Sapir) also toyed with the ideas of linguistic relativity. During the mid century some linguists studied taxonomies, especially color taxonomies, kinship taxonomies and ethnobiological taxonomies.

In the 1970s, the interests of the linguistic community and the intellectual climate shifted and linguistic relativity fell out of interest. In the last decade some interest has been revived because of new studies and ideas about how people speak and understand language, of how the brain is organized, and of how culture and language interact. This book is about these new interests.

The papers in this volume are revised, lengthened, and improved versions of the papers presented at a conference in 1991 and published in the conference proceedings in the same year. The participants are almost all sociolinguists who are more interested in how language is used in conversations and discourses among friends than in the syntactic structures of languages.

The first four papers deal with some new ideas about the relation between language and cognition. The next three papers deal with language and cultural universals. The next three papers deal with how context and background structures determine meaning and interpretation. The final three papers deal with how we think about 'language' and 'culture.'

PART I Linguistic determinism: the interface between language and thought. The editors briefly introduce Part I in Chapter 1. They discuss how the Whorfian hypothesis can be recast in today's terms based on different models of the human mind and different views of language production.

John A. Lucy explains why there have been so few investigations of linguistic relativity during the past thirty years, then reports on how Yucatan Mayan speakers react differently because of their numbering system. Lucy ends by discussing the effects on the language stemming from education of speakers of a language.

Dan I. Slobin describes the results of using a wordless picture book with children of three, five and nine years old and adults, all speaking languages such as English, Spanish, German and Hebrew. He shows how children must learn to attend to different components as they learn to 'THINK FOR SPEAKING' their languages.

Paul Kay discusses the relatively rich inventory of paraphrase possibilities in English such that it is hard to see how language could affect our world view.

Charles M. Keller and Janet Dixon Keller discuss an interview with a blacksmith who makes fine knives. The blacksmith deals mostly with visual images and uses a generic technical vocabulary that can only steer his thinking. Keller and Keller show that human thinking is modular: a visual module, a speech module, a sensation module, and so on. Hence, not all thinking can be informed by speech or patterned by speech patterns.

PART II Universals and variation in language and culture. Levinson gives a preview of the next set of papers, discussing the lack of a good universal metalanguage for discussing cultural universals, even for components such as kinship, space and biota.

Melissa Bowerman discusses how English, Korean, Finnish, Dutch and Tzeltal divide up spatial relationships differently and how children learn about things being ON or IN another object, about sitting down and standing up, and about falling down, before they learn the words to describe such things. Young children learn how their language divides up such spatial relationships (and they do so quickly).

Stephen C. Levinson discusses the very different spatial-directional language systems of English, Guugu Yimithirr (Northern Queensland, Australia) and Tzeltal (a Mayan language of southern Mexico).

Pascal Boyer formalizes the Whorfian principle and shows how it does not account for how people form the classes of ideas covered by words, nor can it shape the ideas of the spirit world of the Fang people of the Cameroon.

PART III Interpretation in cultural context. The editors introduce this section by discussing the cryptic nature of language and how listeners have to fill in lots of meaning and how that insight applies to the deictic systems.

William F. Hanks discusses the structure of conversations and the deictics in Tzeltal, a Mayan language of southern Mexico. He describes the sentence-internal deictics and the sentence-final deictics and how they interact.

John B. Haviland describes how the Tzotzil people of southern Mexico and the Guugu Yimithirr of northeastern Australia handle their deictic systems and gestures in transposed situations as when they tell stories about past events or send messages to people far away.

Herbert H. Clark approaches relativity by showing that speakers must share a common grounding to be able to understand each other, and even then the hearers often have to ask for clarification. Idioms, nouns-from-verbs and compound words are adopted as needed to talk about what people want to talk about. So language structure has little to do with vocabulary.

PART IV The social matrix: culture, praxis, and discourse. Introducing this section John Gumperz discusses the concerns of sociolinguists—how language is actually used in context.

John J. Gumperz describes how second-language speakers may know English grammar and vocabulary but retain their native 'frames' (for conversational interaction) even when interacting with English speakers. He presents some recorded conversations and discusses the different frames the speakers were using and how mismatched frames sometimes lead to misunderstandings.

Elinor Ochs discusses how language participates in the socialization of families and societies, in terms of stances taken by participants and the cues for types of involvement, such as questions and promptings.

Elsa Gomez-Imbert describes the complicated linguistic situation in the Vaupés region of Colombia where speakers of Tukanoan and Arawaken languages intermarry. She then compares the noun classification systems of representatives of the two language families and shows how the two systems are sometimes blended.

The overall impact of the book is that language may play a part in how parents pass on cultural information to very young children (Bowerman) or in how we think for speaking (Slobin), but plays no discernible part in shaping the world-views of the adult speakers. This book, it seems to me, could also serve as a textbook or as supplemental reading for a college-level introductory course in sociolinguistics (though a few papers remind me of some hard-to-read student papers I've graded).

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Historical linguistics and language change. By ROGER LASS. (Cambridge Studies in Linguistics 81.) New York: Cambridge University Press. 1997. 423 pp. Hardback $74.95, paper $29.95.

Reviewed by KEITH SLATER
SIL—East Asia Group

This is a useful and engaging book, discussing and illustrating principles of historical linguistics primarily with Indo-European examples. The book is not intended as an introduction to the methods and practice of historical linguistics. Rather, Lass examines competing perspectives in the field and defends a particular view of HOW historical study should be done, and why his own approach is best. Many of the considerations L raises have been instructive to me in evaluating my own attempts at historical reconstruction (see below), and I have also found the book helpful in my planning to teach an introductory course in historical linguistics. However, the book undervalues some important recent approaches to the study of language change, and this is an unfortunate weakness.

The most useful part of this book is the nuts and bolts methodological discussion found in chapters 3-5. Here, L defends a traditional 'neogrammarian' approach to language history, built around the principle of (nearly) uniform and exceptionless sound change. L considers this the only reliable approach to historical methodology, and gives a very careful and detailed survey of the method and the kinds of results it can achieve.

A particularly useful aspect of the book is L's treatment of issues related to filiation—the placement of particular languages with relation to others within a genetic family (often symbolized with a 'family tree' model). In chapter 3, L outlines his view of how language relatedness can be shown, and points out that this is not the same as the task of reconstruction (which is treated in chapter 5). Genetic relatedness can only be reliably demonstrated on the basis of shared INNOVATIONS; shared RETENTIONS from some protolanguage are relevant to the reconstruction of that protolanguage but cannot be used to argue for genetic groupings within a family.

Similarly, L shows that phonological features are the most reliable indicators of relatedness; while morphology and syntax may also make some useful contribution, L suggests that higher levels of linguistic structure are not generally trustworthy for purposes of reconstruction. An extended example (143-57), using features found in modern Germanic languages, shows that accurate genetic filiation is possible if only phonological innovations are considered, while morphosyntactic features only make the picture murkier.

Chapter 4 demonstrates clearly how the effects of language contact can often be filtered out in order to allow for reliable comparative reconstruction.

I have done fieldwork with a Mongolic language of China, and recently wrote a discussion of its place within the Mongolic language family. After reading L's discussion of this sort of study, I can now see that my own work needs substantial revision and clarification. I would recommend Chapters 3-5 of L's book to any linguist who is undertaking a similar project.

Chapters 1 and 2 outline some of L's strong philosophical commitments, and the final two chapters (6 and 7) return to the issues of what CAUSES linguistic change and what might count as an EXPLANATION of it. This makes interesting reading, although I personally disagree with many of L's conclusions, especially regarding functional explanations and sociolinguistic motivations for change, as well as the significance of language contact. L generally downplays the importance of anything external to the linguistic system itself, preferring to see change as internally motivated. For example, on the notion of 'functionally motivated' linguistic change, L notes (366):

> Since all languages (by definition) possess the defining attributes of natural languages and are 'functional' to the extent that they are used by speech-communities for their normal transactions, it is impossible to talk without contradiction of any change ... 'serving' a linguistic function.

This is an excessively restrictive conception of linguistic function. Similarly, L does not allow that social motivation for a linguistic change, arising from sociolinguistic variation within a linguistic community, may be considered functional, either. Thus, he claims (364):

> Say a change starts in one speaker, or a very small group, and moves from that focus along networks, and beyond to others' networks, along some (extralinguistic) gradients. This must mean that the 'reasons' for the change can't be functional, because in fact they are different for the initiator(s) and the followers; the motivations for the latter are social.

Again, I disagree with such a restrictive notion of 'function'. As a change progresses through a population, it may be functional, not in terms of making the language more fit for communication but in terms of promoting group identity or perceived level of status or friendliness—that is, linguistic change may play a SOCIAL FUNCTION, and thus be functionally motivated. L's attempt to rule out this possibility on philosophical grounds is unconvincing.

The very limited treatment of grammaticalization is disappointing. In one discussion (331), L does recommend a grammaticalization article, noting that he does not completely lack sympathy for this approach as 'an alternate account.' However, L generally does not attempt to incorporate any insights from this approach into his own work, and gives very little description of it. Incorporating grammaticalization into his approach would have strengthened L's book considerably; treating it as an 'alternate account' to be investigated by others, left this reader to feel that 'language change' has not been adequately addressed in this book.

Regarding terminology, L claims (256) that the terms 'grammaticalization' and 'grammaticization' are used to refer to different processes. In fact, these are competing terms for the same phenomenon, generally used by different linguists. See, for example, the discussions of Heine, Claudi and Hu_nnemeyer (1991:3), and Bybee, Perkins and Pagliuca (1994:4).

Perhaps the most interesting feature of L's philosophical discussions is his interest in biology. In defense of his perspective on the mechanisms and character of language change, L draws heavily on principles from biological theory, and the application of these principles to linguistics was, for me, the most thought-provoking aspect of the philosophical chapters.

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Understanding cultures through their key words: English, Russian, Polish, German, and Japanese. By ANNA WIERZBICKA. New York: Oxford University Press. 1997. 317 pp. Cloth $75, paper: $29.95.

Reviewed by PAUL THOMAS
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Anna Wierzbicka has made yet another worthy addition to her corpus (such as 1992) of over 20 books and articles on semantics. In this work, her focus is on explaining key terms such as *friend, freedom, homeland/fatherland* across several languages in order to highlight the differences in the way cultures define them. In doing so her goal is to show how one's perspective on life is influenced by one's language.

Wierzbicka uses as her tool Natural Semantic Metalanguage (NSM)—the basis of a theory that she originated and that she and a group of her colleagues have been developing for 30 years. NSM postulates that in any language there are words that cannot be defined because doing so would introduce circularity into one's dictionary. These words are called 'semantic primitives'. Wierzbicka has gone on to claim that there is a set of semantic primitives that are found across all languages and are therefore universal.

Thus far, nearly 60 candidates have been claimed to be universal semantic primitives. In the English manifestation, they consist of words such as I, YOU, THIS, ONE, TWO, GOOD, BAD, THINK, KNOW, SAY, WORD, DO, HAPPEN, THERE IS, LIVE/ALIVE, NOT, WHEN/TIME, WHERE/PLACE, VERY, KIND OF, LIKE (26). As a sort of 'alphabet of human thoughts', they are combined together to form 'explications' of cultural concepts.

As an example, here is Wierzbicka's explication of English *friend* in its modern sense, as it is found in the phrase *circle of friends* (121):

> *my friend*
>   everyone knows: many people think about some other people like this:
>   I know this person well
>   I want to be with this person often
>   I want to do things with this person often
>   when I am with this person, I feel something good
>   I think this person thinks the same about me
> I think like this about this person

Contrast this with Wierzbicka's explication of the word the most often used in Polish to translate *friend* (122):

> (my) koledzy
> many people think about some other people like this:
>   these people are people like me
>   I know these people well
>   I do many things in one place
>   these people are often in the same place
>   these people do the same things as I
>   I think these people feel the same about me
> when people think like this about other people, they feel something good
> I think like this about these people

So *koledzy* is focused on people who have the same life situation as the speaker, whereas *friend* is focused on an individual relationship. Wierzbicka goes on to explore comparable words in Australian English (*mate*) and Russian as well as words in these languages that form part of the same semantic group.

NSM has great potential for field linguists. Once one gets used to the NSM syntax, it becomes easy to think more rigorously about the meaning of words in a second language, contrasting them with equivalents in one's first language. One can also find equivalents of the semantic universal words in the second language, and define words monolingually using simple phrases.

NSM also may have potential for anthropological activity as well, if one accepts some form of the Sapir-Whorf hypothesis, then searches for key words in a culture, as Wierzbicka does for Australian English (e.g., *chiack, dob in, whinge*) and Japanese.

Yes, Wierzbicka throws down the gauntlet in supporting the Sapir-Whorf hypothesis which she states as having two versions, both of which many anthropologists reject. The strong version: people's thoughts are determined by the categories made available by their language. The weak version: differences among languages cause differences in the thoughts of their speakers (7). That she supports one version (she doesn't make it clear which) can be seen from her evaluation of English, Russian, and Polish with respect to central, non-slang expressions for *friend*. English has just *friend* (*acquaintance* is marginal). Polish has three words. Russian has five. Wierzbicka claims:

> This suggests that Polish culture places a greater emphasis on different types of interpersonal relations than Anglo culture but doesn't go quite as far in this direction as Russian culture (85).

Maybe. One asks whether such a comparison is possible, given that one should also consider counting the adjectives with which *friend* and its equivalents in Polish and Russian can collocate to express shades of meaning (*close, personal, intimate, dear, fair-weather*, to name a few).

Whatever the outcome of the debate on Sapir-Whorf, a search for a culture's key words would be a useful tool for springboarding from linguistics into anthropology. Wierzbicka summarizes the types of data to look for (16):

> (a) Is a candidate word common or frequent? (b) Is an explication of the word able to express something of interest? (c) Is the word found in proverbs, stories, or songs? (d) Does the word collocate with a number of other words to express different shades of meaning? (e) Is the word part of a series of related words?

Wierzbicka indicates that NSM is still evolving through a trial and error process (29-30). This is apparent in places where one encounters inconsistencies. For example, some explications use kinship terms (100-101), another 'pay' and 'have a drink' (210) and in several cases, 'man' (e.g., 76, 115), none of which is to be found in the list of primitives (26). One would think that at least MAN (and WOMAN) would have primitive status by now. There is a disclaimer that the focus of the book is on 'interpreting cultures (via NSM) rather than NSM as such' (30). Still, it would have been helpful to at least italicize words in an explication that are not primitives but are needed for purposes of clarity or are still under investigation as to primitive status.

I recommend this book to field linguists who want to work out precisely the difference between a word and its translated equivalent. I also recommend it to anyone who is interested in defining a key term from one language in another language by using semantic primitives, or at least simple vocabulary. Finally, the book is a good read which points out interesting things about other cultures and about our own culture through the study of key words.

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Clause structure and word order in Hebrew and Arabic: An essay in comparative Semitic syntax. (Oxford Studies in Comparative Syntax.) By UR SHLONSKY. 1997. New York: Oxford University Press. 289 pp. Hardback $75.00, paper $45.00

Reviewed by Andy Warren
Wolfson College, Cambridge and GILLBT—Ghana

The languages studied in this book are Modern Hebrew, Standard Arabic and Palestinian Arabic. Though the title refers to 'comparative Semitic syntax', Shlonsky himself refers to his limited personal knowledge of Arabic, which results in at least three-quarters of the book being devoted exclusively to Hebrew. Since, moreover, many of the particular issues treated are peculiar to Hebrew (such as the periphrastic progressive), this book will be of fairly limited use to Arabists.

The model used is Principles and Parameters, for which Shlonsky refers to Haegemann's *Introduction to government and binding theory*. Though Shlonsky's introductory chapter covers many of his 'general assumptions' (e.g. Checking Theory), this book is strictly for those who can EASILY deal with reading Haegemann and more—this is a highly technical study, and, though well illustrated with examples, is demanding reading!

The particular issues treated are as follows: the ambiguity of the participle as nominal, tensed verb or (in the periphrastic present tense) participial; subject inversion and copula inversion in the present, and 'weak' and 'strong' auxiliaries; present-tense negation using the 'existential' negative particle; discontinuous negation structures; pro drop, and referential and nonreferential (expletive, arbitrary, atmospheric) pro; triggered subject-verb inversion; and cliticised, and 'weak' and 'strong' independent pronouns. These issues, as well as the frequent cross-references to Romance, and even in one section to Berber, might make the book of interest to non-Semitists. Meanwhile, those with a background like mine in DIACHRONIC Semitics will often be startled at Shlonsky's synchronic explanations.

I was most struck by the way in which Shlonsky distinguishes between two types of the same form. For example, the auxiliary *to be* in the present comes in two types: 'independent, freestanding formatives or strong forms, and dependent, clitic, or weak forms'—the latter undergo obligatory copula inversion, 'the process by which the participle becomes the host or provides the lexical support for the weak auxiliary'. Similarly, the freestanding personal pronouns in their nominative, accusative and dative forms come in two types (compare French *le/lui*):

> … weak pronouns are like clitic pronouns except that they are unattached. They cannot be contrastively stressed, they cannot be modified or coordinated, and they may have inanimate referents … Strong pronouns are also freestanding; they may be stressed, modified, or coordinated, but they cannot have inanimate referents. (211)

When the participle appears to be functioning as a tensed verb, that is, when there is no phonetically-realised auxiliary, a null auxiliary is posited, so that

> … the Benoni [participial form] is always a participle, but when it is the only audible verb in the clause, it is preceded by a phonetically unrealized auxiliary. Present tense sentences in Hebrew … are compound tense constructions. (22)

This can be generalised: '… participles are not verbs whose scope of movement is restricted to the "lower part of the clause"', rather 'All verbs and certain adjectival predicates … move to T^0'.

In another place, apparently unmotivated subject-verb inversion in relative clauses is explained as due to the presence of a 'covert trigger—namely a phonetically unrealized resumptive pronoun'. Similarly, the Arabic negative particle *laa* is analysed as containing morphologically unrealised AgrS features. Hence Arabic:

laa	y uḥibbu	Zayd	?al-qiraa?a.
neg	3MS-like(IMPERF)	Zayd	the-reading

'Zayd doesn't like reading.'

is analysed as equivalent to the Hebrew:

Ruti	ʔeyn-a	yoda-ʕat	ʔet	ha-tšuva
Ruti	neg-3FS	know(BENONI)-FS	ACC	the-answer

'Ruti does not know the answer.'

Finally, another interesting argument of cross-linguistic significance is that in which Shlonsky shows how the unavailability of a third-person null subject in Hebrew is—contrary to expectations—NOT related to a lack in morphological richness. Instead, it is related to Benveniste's '... typological claim that in many languages "the 'third person' is not a 'person'; it is really the verbal form whose function is to express the *non-person*"'.

Though I found this book quite a challenge to work through, and the detailed argumentation difficult to follow at points, the less technical summaries at the start of each section and the end of each chapter were very helpful. Shlonsky's style is clear, and the book is well structured and produced (despite a number of typographical errors), with very full notes, bibliography and index. All in all this is an imaginative and provocative treatment of some particularly unusual problems in a language with a unique history. I'm sure Shlonsky himself is pleased with the result, and not only because he can now throw out the boxes of old papers that were filling his office, and which thus, he says, prompted him to write the book in the first place!

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Syntactic theory and the structure of English: A minimalist approach.

By ANDREW RADFORD. 1997. New York: Cambridge University Press.
558 pp. Hardback $69.95, paper $24.95.

Reviewed by JOOST ZWARTS
SIL—Eastern Africa Group (Kenya)

Andrew Radford is known as the author of two excellent introductions to the Government-Binding theory: *Transformational syntax* (1981) and *Transformational grammar* (1988), but given the rapid pace of development in generative grammar, even good introductions like these cannot last more than a decade. The Government-Binding theory of the eighties had to give way to the Minimalist Program of the nineties and it was about time for a new book by Radford to bring people up-to-date with what minimalism is all about.

The Minimalist Program is an endeavour initiated by Chomsky in a number of papers (brought together in Chomsky 1995) to radically cut down the apparatus of syntactic theory in order to determine the most basic principles and representations of natural language. One of the major innovations in the program is the central role that it gives to the concept of ECONOMY. For movement transformations, economy implies, among other things, that movement is no longer optional, but that a word or phrase only changes position to satisfy the requirements of a particular element. This can be illustrated with two interrogative sentences taken from Endo, a Nilotic language spoken in Kenya, both meaning roughly 'Who do you need?' (ignoring tone and advanced tongue root):

(1) *imerey ng'oo?*
you-need who

(2) *ng'oo nyi imerey?*
who this you-need

A minimalist approach might run as follows: economy forces the wh-phrase *ng'oo* 'who?' in (1) to stay *in situ*, but in (2) *ng'oo* has to move to satisfy certain (maybe focus-related) requirements of the element *nyi*. (Or, in 'minimalese': *ng'oo* moves into the specifier of the functional head *nyi* to check its strong (focus?) features before spell-out, lest the derivation would crash at LF).

This last sentence illustrates that, like its predecessors within the generative model, the Minimalist Program is laden with new theoretical terms like 'greed', 'enlightened self-interest', 'crashing' or 'converging' derivations, 'last resort', 'feature checking', etc. Furthermore, Chomsky's works are notorious for their abstruseness and the papers relating to the Minimalist Program are no exception. However, Radford has succeeded in making the program accessible to a wide audience, ranging from beginning syntax students who still need to be introduced to drawing tree diagrams to more experienced generative syntacticians who, for instance, only want to catch up with the number and nature of 'agreement projections'.

As the title suggests, the book is not only about syntactic theory but also about the structure of English. It demonstrates how minimalism applies to classical topics in the study of English syntax, like subject-auxiliary inversion, double objects, verb-particle constructions, and the distribution of adverbs. Most of the examples in the book are taken from Standard English, but in order to demonstrate the comparative potential of the Minimalist Program, Radford also presents many examples from older stages of English, the English spoken by young children, English dialects and an English-based Creole on Jamaica.

The book has the following ten chapters: 1 Principles and parameters; 2 Categories and features; 3 Syntactic structure; 4 Empty categories; 5 Checking; 6 Head movement; 7 Operator movement; 8 A Movement; 9 VP shells; 10 Agreement projections.

Chapter 1 starts on a very basic level, accessible even to beginners with no background in generative grammar, but the complexity of the syntactic analyses offered increases with every chapter. When the reader has reached the final chapter the (slightly simplified) structure of the prepositional phrase *with me* in (3) will not come as a surprise (Radford 1997:452):

(3) $[_{PP}\ [_{P}\ \text{with}\ ]\ [_{AgrOP}\ [_{D}\ \text{me}\ ]\ [_{AgrO'}\ [_{AgrO}\ t\ ]\ [_{PP}\ [_{P}\ t\ ]\ [_{D}\ t\ ]]]]]$

Each chapter has a wealth of exercises, some with model answers. There is an extensive glossary with terms used in the book, not only the technical terms of the Minimalist Program but also widely used grammatical terms, and an index. The only thing that could have been added to help minimalist novices find their way in the literature is a short section with references to useful books and articles relating to the topics of a particular chapter.

Syntactic theory and the structure of English may not be terribly useful to the field linguist because it is almost entirely devoted to the syntax of (some varieties of) English and because the analyses of the Minimalist Program are a bit too abstract and theoretical for those who are mainly concerned with data gathering and description. However, for those who want to go beyond the surface of word order patterns and morphological marking, digging for deeper insights into the syntax of a language, Radford's book will certainly be of help. Moreover, linguists working with a functionalist orientation might find it interesting to know how the Minimalist Program combines formal syntactic representations with the functional concept of economy.

Finally, for those for whom 558 pages are really too much, Radford has been so kind to write an abridged version, *Syntax: A minimalist introduction*, which covers the same area, but in much less detail [Editor's note: this work is reviewed in this issue of *Notes on Linguistics* pp. 43-45.].

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Numbering change for *Notes on Linguistics*

With this issue of *Notes on Linguistics* a change is being made in the way issues are numbered. Previous issues were Numbers 1 through 83. The present issue is Volume 2, Number 1, essentially treating all previous issues as Volume 1. Four issues will be published each year, as in the past. The reason for this change is to bring all of the *Notes* published by different academic departments of SIL into the same schedule and numbering format in order for the Academic Publications Department to regularly distribute the various *Notes* issues together. —David Payne, Editor

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New Book by International Linguistics Advisors Malcolm Ross and Andrew Pawley

The Lexicon of Proto Oceanic: the Culture and Environment of Ancestral Oceanic Society. Volume 1: Material Culture. Edited by MALCOLM ROSS, ANDREW PAWLEY AND MEREDITH OSMOND. PL C-152. Canberra, Research School of Pacific and Asian Studies, Australian National University. 350pp + xxi + maps. A$59.

The volume consists of essays dealing with terminologies for architectural forms and settlement patterns, household artefacts, gardening practices, food preparation, canoes and seafaring, fishing and hunting implements and verbs of impact, force and change of state. Over 1000 reconstructions are listed with supporting evidence. Also included are an outline of Proto Oceanic phonology and morphology, a number of maps and an index of reconstructions.

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From the Linguistics Coordinator

The role of the International Linguistics Department

A few months ago, when people asked me 'What does the International Linguistics Coordinator DO?', the answer was obvious: coordinate international linguistics, of course! As a result of intense briefing by my predecessor Lou Hohulin, an on-line departmental manual created by Chip Sanders, and a few months of actually being in the job, the fog has lifted at least a little. In this first column of what I expect will be a regular contribution to *Notes on Linguistics*, I want to outline what I see as the role of the International Linguistics Department of SIL.

The department relates to non-SIL people and organizations in significant ways, but I would like to beg their indulgence while I specifically address our own field linguists in this first column. We exist first and foremost to serve the needs of the Ordinary Working Linguists (OWLs) of SIL. This can be either directly, such as responding to requests for information, or indirectly, such as our contributions to language software and training linguistics consultants. In future columns, I'll be highlighting specific functions in more detail. But in this issue, I want to stress the basic values that drive those specific services.

- **Caring**: We want to constantly remember that our top priority is the OWL out there, doing the best he or she can under circumstances far removed from an air-conditioned academic institution. You are the core of SIL, not me. If any of you OWLs are passing through Dallas, drop by our (air-conditioned) department for a chat.
- **Communication**: We want to serve as links from one person to another. If people have the same linguistic interests, they should know about each other. If there is a workshop or conference that would be helpful, we want to let you know about it. We also want to continually get input from the field; when we know what's going on, we are more effective in helping you.
- **Coaching**: We want to help you do the best linguistics you can. This can be through articles and reviews in *Notes on Linguistics*, through workshops run by our linguistics consultants, through our contributions to linguistics software such as LinguaLinks, through steering you to relevant linguistic material or even sending it to you. Part of our job is to help you to be successful.
- **Cheering**: We want to recognize significant achievements in linguistics. The selection of Rod Casali's dissertation for Garland's

Outstanding Dissertations in Linguistics Series mentioned below is but one example. Publishing of major grammars or dictionaries, as well as PhD dissertations, are also items to recognize. Let us know about such things!

- **Check-up**: In order to know what we need to do, we need to know what's going on in the fields. Ideally, I'd spend maybe half my time visiting our fields around the world. Practically, I may make a couple of international trips per year. So I depend on reports people give me, formally or informally, about what's happening in their neck of the woods. I try to grab people coming through Dallas and pick their minds on what's going on 'out there'.
- **Cultivating the vision**: We want to continually affirm the high value linguistics has in SIL, and increase that. For the tasks of literacy and translation in SIL, good linguistics is not only foundational, but crucial on an ongoing basis. We want to spread the value of not only gathering data, but writing it up. Linguistics is crucial to our own literacy and translation tasks, crucial to helping our SIL colleagues, and of great value to the outside academic word as well.

Casali dissertation selected by Garland

Rod Casali's recent UCLA dissertation (abstracted in *NOLx* 76, Feb. 1997) has been selected to be published in Garland Press' Outstanding Dissertations in Linguistics series. In this dissertation, 'Resolving Hiatus,' Casali surveyed 91 languages to discover patterns in resolving vowel hiatus which had not been noted before. Garland selects only eight dissertations a year out of the hundreds which are written. Our congratulations to Rod. (Rod currently serves as Africa Area Linguistics Coordinator for SIL.)

Mike

—Michael Cahill
International Linguistics Coordinator

■

‘Unruly’ phonology:
An introduction to optimality theory[1]

Michael Cahill
SIL—International Linguistics Coordinator

1. Introduction. The idea of doing phonology without rules may seem bizarre to those accustomed to rules and their sometimes complex interactions. But that is precisely what Optimality Theory does. Optimality Theory, or OT, was introduced in Prince and Smolensky (1993) and McCarthy and Prince (1993a, b). It has become the theory of choice for many American phonologists in the last several years, as shown by the many papers presented within the OT framework in recent conferences. In this paper, I will introduce the basic principles of Optimality Theory and compare it with a traditional generative theory that uses rules. My purpose is not to give a comprehensive course in OT (this article by itself won’t equip you to use OT), but rather to give the rationale behind OT, how it works, and some of its strengths and current weaknesses. This article will serve as an introduction to the basic literature on OT, much of which is not easy reading.

Optimality Theory does away with rules in favor of CONSTRAINTS. Actually, constraints of various sorts have been used for quite a long time in phonology, alongside of rules. These constraints have ranged from morpheme structure constraints and the Obligatory Contour Principle, to various language-specific constraints. From past experience, it seems that rules by themselves are not enough; constraints of some sort are necessary. But given that constraints are needed, are rules then necessary? The Optimality Theory approach says ‘No’. Russell (1997:110) compares constraints added to rules to band-aids applied to a patient, and adds ‘One might view Optimality Theory as the band-aids getting together, realizing their own power, and deciding they could get along quite nicely without the patient.’ All things being equal (which they of course never are!) it is simpler to have a theory which has only constraints rather than constraints AND rules.

Constraints within a rule-based theory are like rules in that they are unbreakable where they apply (with perhaps some lexical exceptions). However, constraints in Optimality Theory can be violated in the appropriate circumstances, since one constraint may push in one direction, and another constraint may push in a different direction. When two forces push in opposing directions, one generally proves stronger and 'wins out'. In real life, I want to get a good night's sleep, but I also want to finish a book I'm reading. I can't do both—which desire wins? In phonology, I want to pronounce every consonant that a word contains, but I also want to have a CV syllable pattern, which is easier to pronounce. Often I can't do both—which pattern wins? In Optimality Theory, any constraint can in principle be violated.

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[1] Many thanks to friends and colleagues who read this manuscript for clarity and accuracy: Fraser Bennett, Rod Casali, Tsan Huang, S. A. Miller, Ken Olson, and Paul Thomas. Probably none of them is totally satisfied with the result, but it is a much better article for their input.

Another difference between rule-based approaches and Optimality Theory is that rules are usually assumed to apply in a particular order ('serially'), and this order is sometimes crucial.[2] However, in OT, potential surface forms are scanned for violations of constraints, and how well constraints are satisfied is evaluated simultaneously for all constraints ('in parallel'). We can represent these two approaches as below.

(1) Rule-based schema - a derivation

Underlying representation	/kænnat/	'cannot'
Rule #1 applies	kænat	
Rule #2 applies	kænt	
Rule #3 applies	kæ̃nt	
Rule #4 applies	kæ̃nʔ	
Rule #5 applies	kæ̃ʔ	
Surface form	[kæ̃ʔ]	

(2) Constraint-based schema

Underlying representation	/ kænnat/	
	↓	
	possible forms	
	↓	
Surface form	[kæ̃ʔ]	*selected by constraints*

In contrast to a serial rule-based approach, the constraints relevant to the form are all considered in parallel, simultaneously. What determines the outcome is not the serial ordering of rules, but the relative strengths, or RANKINGS, of the constraints. A constraint is not absolute, but can be violated when a higher-ranked constraint applies to the same form.

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[2] I ignore here the debates in the past on simultaneous vs. sequential application of rules, and what principles should govern the ordering of rules.

For example, take the word 'impossible', assuming an underlying form of /in-possible/ (the nasal assimilates in place to the following /p/). Suppose there is one constraint that says 'preserve the underlying place of a consonant', and another constraint that says 'nasals have the same place features as a following consonant'. So there are two possible outcomes. If the 'preserve place' constraint is more highly ranked, there will be no assimilation, and we get 'inpossible.' But if the 'nasal has same place' constraint is more highly ranked, there will be assimilation, and we get 'impossible'.

Since real examples usually are more complex than this, rankings are usually displayed in a TABLEAU (plural either TABLEAUX or TABLEAUS, depending on how erudite one wishes to sound). A tableau shows possible surface forms, the constraints relevant to those forms, and how the constraints are violated. Let us consider the concrete example of devoicing of the English plural morpheme /-z/ after a voiceless stop. We will refer to three constraints, which are named and defined below. Note that underlying and surface forms are generally termed INPUT and OUTPUT.[3]

(3) Sample Constraints

CC(voice): consonant clusters must have identical values of the [voice] feature

IDENT(voice): the value of [voice] in an input segment is identical to its value in the output

IDENT(voice)$_{ROOT}$: the value of [voice] in an input *root* segment is identical to its value in the output

Names of constraints are mnemonics for the full definition of the constraint, and are usually short to fit concisely into a tableau. In tableaus, constraints are listed in the top row; higher-ranking constraints are to the left, lower ones to the right. A solid line between the columns means the constraints are definitely ranked in that order, while a dotted line indicates that the ranking between those candidates is undetermined. The notation '>>' means 'outranks'. In the tableau in (4), the underlying representation of [bʊks] 'books' is assumed to be /bʊk+z/; this is listed in the top left cell below. In the left column, under the underlying representation /bʊk+z/, are several CANDIDATES generated from the underlying representation. The 'winning candidate', the one which is actually pronounced, is denoted by a pointing finger (☞) or some other marker. The order in which these candidates are listed is not important, though the winning candidate is often listed first.

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[3] Though the notions of underlying representation and surface form are still used by most, some researchers (e.g. Russell 1995, Flemming 1995, Hammond 1995, Burzio 1996) have proposed that OT makes the idea of underlying representations superfluous.

(4) [buks] 'books', with CC(voice), IDENT(voice)$_{\text{ROOT}}$ >> IDENT(voice)

/buk+z/	CC(voice)	IDENT(voice)$_{\text{ROOT}}$	IDENT(voice)
☞ a. buks			*
b. bugz		*!	*
c. bukz	*!		

The number of generated candidates is considered to be infinite, but only the most likely and relevant ones are actually listed in the tableau. These candidates are judged as to how well they conform to the set of constraints. The constraints we are considering here are in the top row. If a candidate violates a constraint, that violation is marked with an asterisk (*). A particular candidate can violate one or more constraints. The violation that actually prevents that candidate from surfacing is called a 'fatal violation' and is indicated by an exclamation point to the right of the asterisk that marks that violation (*!). Often the cells to the right of this fatal violation are shaded as a visual aid to draw attention to it, and to show that the constraints in those columns are irrelevant to evaluating that candidate.

So in the tableau in (4), candidate (a) is the winning candidate, even though it has violated the constraint **IDENT(voice)**. It violates it because the suffixal [s] in the output is unvoiced, while the input /z/ is voiced. Candidate (b) also violates **IDENT(voice)**, but more importantly, also violates **IDENT(voice)$_{\text{ROOT}}$**. It is more important to preserve voicing in a root consonant than in other consonants, so **IDENT(voice)$_{\text{ROOT}}$** outranks **IDENT(voice)**. A violation of **IDENT(voice)$_{\text{ROOT}}$** is enough to make candidate (b) lose.[4] Candidate (c) loses because it violates **CC(voice)**. From the data above, we cannot tell the respective ranking of **CC(voice)** and **IDENT(voice)$_{\text{ROOT}}$**, so they are separated by a dotted line.

Only the candidates most relevant to the phenomenon under consideration are listed, in this case voicing of the final consonant. Other candidates which could be considered include ones in which several vowels are inserted, or all consonants are deleted, or the entire output is [aaaaaaaaaargh]. These are quite different from the input and would not normally be considered. More formally, they would be eliminated from consideration by other constraints not listed here. For example, [bʊk] would be eliminated by a constraint which prohibits deletion of consonants (**MAX(C)**, in the listing in 6).

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[4] A considerable literature is growing on 'positional' contrast, formalizing the observation that initial vs. final position in a word or whether the sound occurs in root or affix, makes a difference in what contrasts are available in a language, how faithful the output is to the input, and how likely neutralization is to occur. See Beckman (1997) and Casali (1997), as well as Steriade (1994, 1997).

Constraints in Optimality Theory are proposed to be universal, that is, all constraints are present in all languages. The differences in phonologies of various languages are due to the difference in rankings of constraints. This re-ranking of constraints across languages can provide a fruitful field of cross-linguistic inquiry. The TYPOLOGY which is produced by different rankings of constraints will predict specific patterns across languages depending on the ranking of the constraints under examination, and is one check on whether the constraints proposed have any connection with reality. If, for example, three independently-rankable constraints A, B and C are proposed, then there are six possible rankings, assuming it is possible to clearly determine the ranking of each with respect to the others. If these constraints are all actually valid ones, then languages could be found which exhibit each of the six rankings. The search for all these languages is quite time-consuming, of course, which is quite likely the reason so few wide-ranging cross-linguistic studies have actually been carried out.[5]

To sum up, Optimality Theory is a 'non-derivational' approach to phonology; it does not have a series of steps or levels from underlying representation to surface form. The following table (Table 1) summarizes the differences between OT and rule-based approaches.

Comparison of rule-based and OT approaches

Rule-based approach	Optimality Theory
derivational	non-derivational
serial	parallel
rules & constraints	constraints only
language-specific rules and constraints	universal constraints
intermediate levels	only underlying and surface forms

Table 1

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[5] One cross-linguistic study in the OT framework is Casali (1997), who surveys 87 languages examining vowel elision phenomena. Another ongoing attempt at a wide sampling of languages is Cahill (1998), who to date has examined 28 languages which have floating tonal associative morphemes.

2. What OT can do. OT excels in unifying accounts of varied phenomena which could not be unified under a rule-based system. What have been termed 'conspiracies' of rules have been noted since Kisseberth (1970). Conspiracies are several rules that work together to give the same result in a single language. In OT, a single set of constraints can account for varied inputs having similar outputs.

But this unifying strategy may also be extended to cross-linguistic situations. A concrete example is rules of insertion and deletion. Let us consider two hypothetical languages. Given a root ending in a consonant and a suffix beginning with a consonant, Language A inserts a vowel between the root and the suffix, while Language B deletes the final stem consonant:

(5) Language A /bak + to/ → [baki̲to]
Language B /bak + to/ → [bato]

What unites these, the driving force in both cases, is the push for a CV syllable pattern and avoidance of a closed, CVC syllable. There is a constraint called **NoCoda,** prohibiting closed syllables, which outranks any other relevant constraint, i.e. it is UNDOMINATED. The two languages satisfy **NoCoda** in two different ways—using the same constraints but with different rankings. The relevant constraints are listed below.

(6) NoCoda: codas are not allowed
Max(C): any consonant in the input is present in the output
(prohibits deletion of consonants)
Dep(V): any vowel in the output is present in the input
(prohibits insertion of vowels)

These are commonly invoked constraints. **Max** is for 'maximize the output', and **Dep** is for the output 'depends on the input'.[6] Following are the tableaus for hypothetical language A (7) and Language B (8). Neither language allows codas, so **NoCoda** is undominated. The difference is in the rankings of the other two constraints. In Language A , **Max(C)** outranks **Dep(V)**, and so deleting a consonant is worse than inserting a vowel. So to satisfy **NoCoda** and **Max(C)**, a vowel is inserted. We will assume the inserted vowel here is [i]; the issue of choosing between this and other possible vowels is ignored here for the sake of brevity.

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[6] In the original Optimality Theory of Prince and Smolensky (1993), there were PARSE and FILL constraints which related to insertions and deletions. These have been replaced in the more recent Correspondence Theory version of Optimality Theory in McCarthy & Prince (1995), which uses the "Faithfulness" constraints **IDENT**, **MAX**, and **DEP**. These latter are the ones I discuss here.

(7) Language A - insertion of vowel into CC cluster

/bak + to/	NoCoda	Max(C)	Dep(V)
☞ a. bakito			*
b. bato		*!	
c. bakto	*!		

On the other hand, in Language B, **Dep(V)** outranks **Max(C)**, so it is worse to insert a vowel than to delete a consonant. To satisfy the top-ranked **NoCoda** and **Dep(V)**, a consonant is deleted. (Deciding WHICH consonant is deleted would involve another constraint or constraints.)

(8) Language B - deletion of consonant in CC cluster

/bak + to/	NoCoda	Dep(V)	Max(C)
☞ a. bato			*
b. bakito		*!	
c. bakto	*!		

A derivational generative account of the same phenomena involves rules, of course. In Language A, we need a rule inserting [i] between two consonants, and in Language B, we need a rule deleting the first of two consonants:

(9) a. Rules:

Language A:	**i-insertion rule**	Ø → i / C__C
Language B:	**C-deletion rule:**	C → Ø / __C

b. Derivations:

	Language A
underlying form	/bakto/
i-insertion rule	bakito
surface form	[bakito]

	Language B
underlying form	/bakto/
C-deletion rule	bato
surface form	[bato]

These rules appear simpler than the machinery needed for the optimality approach. If a single process of a single language is considered, it truly is more compact to express that process with a rule. However, there are other factors to consider. First, a constraint in OT does not apply only to the situation at hand, but will make its presence felt in MANY different phonological contexts. When one considers the total number of rules needed to account for the phonology of a language vs. the total number of constraints which are active in a language, they might appear more equal (actually, this is an exercise that has never been attempted to my knowledge). Second, and perhaps more importantly, the SAME constraints can be used cross-linguistically, with the only difference being a difference in ranking. One can see a functional unity to vowel insertion vs. consonant deletion illustrated in the hypothetical but realistic Languages A and B when constraints are used, but with the rules, there is NO formal relationship at all between the two processes.

Constraints can be of many forms, but fall into two major types. One type is the so-called 'faithfulness' constraints, and the other type is constraints to enforce well-formedness. The faithfulness constraints have been referred to already; they enforce fidelity of the output to the input. In perfect faithfulness, the output is identical to the input. The **MAX** family of constraints prohibits deletion of segments and so 'maximizes' the output. The **DEP** family of constraints prohibits insertion of segments and so the output 'depends' on the input. The **IDENT** family of constraints says that a given feature has the same value in the output as in the input. Generally, then, **MAX** and **DEP** constraints refer to the presence or absence of segments, and **IDENT** constraints to values of individual features.[7] The general form of the constraints is the following.

(10) IDENT(F): a feature has the same value in the input as in the output.
MAX (S): a segment present in the input is also present in the output
DEP (S): a segment present in the output is also present in the input

Above, (F) can be any feature, and (S) can be any segment.[8]

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[7] With the view of some features as privative rather than binary (e.g. [voice] is either present or absent, not having a value of [+] or [-]), sometimes the MAX and DEP constraints are applied to individual features as well, such as [voice] (Lombardi 1998) and tones (Myers & Carleton 1996).

[8] A fuller name of these constraints includes 'I-O', for 'Input-Output', since it is the correspondence between input and output forms that is being discussed, e.g. MAX-IO(V), referring to a vowel in the input and output. Other correspondences discussed in the literature are B-R (base-reduplicant) and I-R (input-reduplicant). For most relationships, however, it is

The other major constraint type involves constraints that enforce well-formedness. Certain sequences are prohibited (e.g. our ***CC** earlier), adjacent segments must agree in certain qualities (like our **CC(voice)** earlier), etc. A major schema of well-formedness constraints is the **ALIGN** strategy, in which one entity 'aligns', or has coinciding edges, with another entity. As an example using features, one may observe that if a suffix has a round vowel, all the root vowels are also round. A constraint expressing this generalization is

(11) **ALIGN([+rd],Left; Wd, Left):** the left edge of a [+round] feature is aligned with the left edge of a word

In a rule-based framework, we would say the [+round] has spread leftward. In OT, we observe that all the vowels to the left ARE round. One characteristic of **ALIGN** constraints is that they can be GRADIENTLY violated. That is, if the element under consideration is perfectly aligned, there is no violation. But if it misses by one segment, the constraint is violated once, if it misses by two segments, there are two violations of the constraint, and so on.

Let us give a concrete illustration. Bantu languages often have elaborate schemes for spreading tones. A High tone from a prefix may make an entire word High-toned. But in many Bantu languages, the final vowel is NEVER High, though the rest of the word might be. In a rule-based approach, we might have a rule that spreads a High tone rightward as far as it can, then another rule that delinks the High on a final syllable. In OT, this translates into two constraints. One constraint says that a High tone is aligned to the right edge of a word, and another constraint prohibits High tones on word-final syllables (or moras, if that is the tone-bearing unit).

(12) ***Final-H:** a High tone is not allowed on a word-final syllable

ALIGN(High, Rt; Wd, Rt): the right edge of a High tone is aligned with the right edge of a word (**ALIGN H-Rt**)

Let us take a hypothetical example *kí-bábábà* (acute accents indicate High tone, grave accent is Low tone), where *kí-* is a High-toned prefix, and *bababa* in a context without the prefix is all Low-toned, so we know the High tones in it are a result of the prefix. Using the two constraints above, we have the following tableau (13).

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the relationship between input and output which is in focus, and often, as in this paper, the I-O is omitted.

(13) Hypothetical *kí-bábábà*

kí-bababa	*Final-H	ALIGN H-Rt
☞ a. kí-bábábà		*
b. kí-bábábá	*!	▨
c. kí-bábàbà		**!
d. kí-bàbàbà		**!*

The winning candidate (a) violates **ALIGN H-Rt**, since the High tone is not aligned with the right edge of the word. But aligning the High with the right edge, as in candidate (b), violates the more highly-ranked ***Final-H**, and loses for that reason. Candidates (c-d) do not violate ***Final-H**, but lose because they violate **ALIGN H-Rt** more times than (a) does. Candidate (c) has a High tone two syllables from the edge of the word, and so incurs two violations of **ALIGN H-Rt**, and candidate (d) incurs three violations. Since two violations are enough to make it lose (compared to (a)), the fatal violation (!) is marked after the second asterisk in both (c) and (d).

3. A more in-depth example. A feeding order of rules is easily handled by Optimality Theory. For example, let us take an input of /spap/ in Language A. The surface form is [šipap], reflecting insertion of the vowel [i] and palatalization of the /s/ to [š]. In a rule-based account, we have a rule of i-insertion and a rule of palatalization. The rule of i-insertion feeds palatalization; palatalization does not occur except before [i]. So a derivation of [šipap] would be:

(14)		
	Underlying representation	/spap/
	i-insertion rule	sipap
	palatalization rule	šipap
	Surface form	[šipap]

If the order of the rules were reversed, we would get the different output [sipap], so the ordering is crucial.

In an Optimality Theory approach, there are several possible approaches that could be taken, and which approach is chosen depends on the patterns of the language as a whole. Here is one approach. The vowel insertion is presumably motivated by a desire to avoid word-initial consonant clusters. To account for this, it might be noted that there are no consonant clusters anywhere in the language, and so a constraint ***CC**, forbidding consonant clusters altogether, would be the relevant one. The **MAX(C)** and **DEP(V)** constraints from (6) will be called upon again, with **MAX(C)** outranking **DEP(V)** as in (7) to get insertion of a vowel rather than deletion of a consonant. To force palatalization, either one constraint forcing sharing of a [-anterior] feature of [coronal] segments, or a combination of constraints which give that effect could be proposed. I will assume here a single constraint **Pal**. The tableau would then be:

(15) Palatalization and insertion of i

/spap/	Pal	*CC	Max (C)	Dep (V)
☞ a. šipap				*
b. sipap	*!			
c. spap		*!		
d. sap			*!	

As before, motivating the insertion of [i] rather than another vowel would require more constraints than what are listed, and we will ignore this for our purposes here. We can see that we can easily get the correct output with appropriate constraints. Candidate (a), the winning candidate, violates **Dep(V)** by inserting the vowel, but since that constraint is ranked low, that is permissible. Candidate (b) loses by not palatalizing [s] before the [i]. Candidate (c) loses by having a consonant cluster. Candidate (d) loses by deleting a consonant. From the above tableau, we can see that **Pal, *CC**, and **Max(C)** are all ranked above **Dep(V)**, since a violation of **Dep(V)** is not fatal, but a violation of the other constraints is. However, we cannot determine the relative rankings of these other constraints without looking at more data.

4. Further issues. Three other topics relating to OT deserve comment: the assumed universality of constraints, what criteria are used to evaluate a constraint as a principled or 'good' one, and how well OT handles cases of relations between rules.

Constraints are generally assumed to be universal—that is, all constraints exist in all languages, though they may be ranked so low that their effects are not visible. (Prince & Smolensky 1993, McCarthy & Prince 1995, Archangeli 1997). However, Russell (1997), in the same volume as Archangeli, maintains that constraints which refer to categories specific to a particular language cannot be part of Universal Grammar, and presents several such cases. This seems an irrefutable point, since a morpheme of a particular language cannot possibly be universal. In my own dissertation (Cahill in progress), there are several examples of constraints which must refer to specific Kɔnni morphemes.

The matter of what makes a constraint 'good' or 'principled' is still an open question. Most researchers do not explicitly discuss the issue, but some have. Recent work by several researchers (e.g. Beckman 1997, Casali 1997, Steriade 1994, 1997, Jun 1995, Kaun 1995, Flemming 1995, Kirchner 1998, Boersma 1998) suggests functional reasons for many constraints based on phonetics. Hayes (1996), while acknowledging the phonetic basis for many constraints, has pointed out the difficulty of translating experimental phonetic results, which typically give gradient results, into phonological terms which are typically categorial. He suggests two types of 'principled' constraints: those based on typological, cross-linguistic evidence, and those motivated by phonetic functionalism. As a rule of thumb, I believe it is good practice to motivate the constraints one uses by either referring to their cross-linguistic commonality or their inherent phonetic plausibility.

There has been considerable effort expended on the intricacies and motivations for rule ordering. How does this type of data fare in an OT approach? Briefly, the answer is both very well and not very well at all, depending on the type of rule interaction considered. For cases involving feeding orders, for example, OT performs well, as in the last section, but cases where counterfeeding rule order is involved have been problematic.[9]

5. Resources for Optimality Theory. The most basic introduction to Optimality Theory is by Archangeli and Langendoen (1997). This is quite readable and includes chapters on how OT applies to feature theory, morphology, and even syntax, as well as phonology. The foundational works by Prince & Smolensky (1993), McCarthy & Prince (1993a, b), McCarthy and Prince (1995) are more difficult reading, but worthwhile. Much of the work in OT has been published electronically instead of in paper form. The biggest repository of such electronic OT papers is the Rutgers Optimality Archive Internet website, found at *http://ruccs.rutgers.edu/roa.html*. Each paper on this site has been given its own unique reference number. In this article, when a reference has been taken directly from the Rutgers Optimality Archive, the source is given as ROA-###.

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[9] An additional topic is how OT relates to other theories of phonology. The main answer is that it does not address these theories directly. One may have autosegmental representations in OT tableaus, with constraints ruling out one configuration of association lines vs. another. Feature geometry can be included in OT (though there have been claims that OT makes association lines and Feature Geometry superfluous). Metrical grids can likewise be incorporated into OT. Lexical phonology with its ordered strata might be thought of as generally antagonistic to the spirit of OT, but even McCarthy & Prince (1993a:24) propose strata, each having its own distinct constraint ranking, for Axininca Campa.

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Dissertation Abstract

Borrowing vs. Code-switching: Malay insertions in the conversations of West Tarangan speakers of the Aru Islands of Maluku, eastern Indonesia

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The present work has three main goals. Its first goal is simply to describe the language contact phenomena (LCP) occurring in a corpus of conversations among bilingual West Tarangan (WT) speakers of Dobo town in the Aru islands of southeast Maluku, Indonesia. The corpus consists of 15 hours of conversations among 28 native speakers of WT, and is notable not only for containing nearly twenty thousand Malay insertions (tokens), but for actually containing far more Malay word types than WT word types.

The second goal of the present work is to determine to what degree discourse context and differences between the lexicons of the two languages involved constrain the language choices of bilinguals. I approach the data from the perspective of individual speakers rather than from a societal perspective, and find significant differences between the language mixing patterns of different speakers. As a necessary methodological precursor to analyzing code-switching (CS), I perform a lexical analysis of the lone Malay items in the corpus to determine which concepts were represented as Malay by default and which could be said to involve language choice rather than lexical choice. I demonstrate that many Malay lexical units which occur in the corpus represent a more or less 'default' use of Malay, either because of various features of the lexical units themselves or because of the interaction between participants in the discourse. In contrast to many other studies of LCP, then, the current work approaches the data from a psycholinguistic perspective rather than a sociolinguistic or syntactic perspective.

The third goal is to account for the multi-word stretches of Malay occurring in the corpus. I propose that some instances of language choice involve a switch in language mode while others do not. I submit the data to three cycles of analysis in order to determine a speaker's psycholinguistic motivations for shifting into Malay mode. This study supports the claims of some researchers that there is no definite boundary between CS and other LCP such as borrowing, but that instead there is a continuum of LCP.

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Reports

What's new in LinguaLinks Bookshelf

Paul Thomas
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LinguaLinks version 3.5 is now available. The Linguistics Bookshelf has been considerably enhanced. Here are some of the enhancements.

New books:
An introduction to phonological analysis, by Stephen Marlett.
Tools for analyzing the world's languages: Morphology and syntax, by Albert Bickford
Acoustic phonetics, chapters 2-5, preliminary edition, by Joan Baart

These books in their electronic form contain features that are not available in printed editions (where printed editions exist), such as a clickable outline pane, jump links to footnotes, links to text from index page numbers, and links to sound files from which formant plots, for example, were generated (this latter in *Acoustic phonetics*).

Classics by SIL members:
How to analyze a language, by Charles Peck
Handbook on lexicography for Phillipine and other languages, by Leonard E. Newell

An article: 'Unruly' phonology: an introduction to optimality theory, by Mike Cahill [also found in this issue of *NOLx*]

Other enhancements:
All except the most recent issue of *Notes on Linguistics* have been included.
Analyzing discourse, by Robert Dooley and Stephen Levinsohn, has been revised.
The task and tools helps have been separated and reorganized into two online books, entitled *Doing Linguistics* and *Using the LinguaLinks tools*. There has been some linking of material within these books to material contained elsewhere in LinguaLinks, such as *Notes on Linguistics*.

The future:
We are working on including several books on lexicography.

We will include a book by Anita Bickford on articulatory phonetics.
We are working with authors to try to get contributions on orthography and Role and Reference Grammar.
We will work towards integrating the linguistics bookshelf with the Texas SIL in such a way as to enable distance learning.
We are accumulating a list of useful linguistics websites.
We will add URL links to the worldwide web.

We are looking for contributions in the following sorts of areas:
Language family descriptions
Annotated bibliographies of linguistic frameworks, phenomena such as ATR, and language families.
Feedback on and enhancements of material that is incomplete or preliminary.
We are pleased about the enhancements in this new version, but recognize that we have much still to do. Your help in providing feedback and contributions will be most welcome!

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What's new in LinguaLinks Workshops

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Here are new features in Version 3.5 of the workshops:

New data import tools (stand-alone programs)
IT2PText —new Windows converter for interlinear texts to facilitate import into LinguaLinks
Dictionary Converter —new Windows converter for dictionaries to facilitate import into LinguaLinks

Here are new features and fixes that were previously added in Version 3.0 of the workshops:

Lexical database
The autoset function allows you to create indexes at any time. If you have added glosses in other languages, indexes will be set for all of them. Existing indexes are unaffected.
Sense objects are inserted in the correct location in the data entry window.

In the lexical relations set editor, (1) an insertion point is provided for the first entry of a new set, and (2) displayed gloss languages correctly match current preferences.

Program constraints on the addition of citation forms have been removed so that text links to a lexical entry are not affected by adding a citation.

Word analysis

The Wordform Inventory Editor word list now defaults to an alphabetical sort with the number of occurrences of each wordform shown in parenthesis. As before, you may change the sorting method by using Options…Preferences on the menu.

In the Wordform Inventory Editor, two new functions have been added to the Tools menu: (1) Merge duplicate wordforms (simplifies dealing with duplicates), and (2) Reset frequency counts (eliminates program delays for frequent automatic counts by letting you decide when updating is important)

In the Word Analysis editor, new functions allow you to (1) create new senses without jumping to the lexical database sense editor, and (2) create new sense combinations and new senses at the same time

In the Word Analysis editor, the sense chooser displays parts of speech and definitions with each sense to help you choose.

Morphology explorer

In the morphology explorer, new functions allow you to (1) to search the baseline text for words and parts of words, and (2) to display all glosses at all levels linked to a particular wordform.

Interlinear texts

The toolbar has a Prepare for analysis button.

Alternate encodings of the baseline display correctly.

The RTF view of interlinear texts shows prefix and suffix markers, and displays upper ASCII characters correctly.

Setup wizards

In the Encoding setup sequence, the Multigraph and Character Set displays now include code points for each item.

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Discourse Across Languages and Cultures:
The 24th UWM Linguistics Symposium
Milwaukee, Wisconsin, September 1998.

Conference report by WILLIAM C. MANN
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This Symposium proved to be both significant and interesting. Here I will review its content and give some reactions.

'*Discourse Across Languages and Cultures*' is relevant to translation—whether doing it or studying it. Some aspect of this topic touches every SIL activity, especially in those aspects that are involved with development of translation standards and methods for achieving high quality and acceptance of translated text.

The Symposium represents four different orientations to the topic. The meeting is not simply a report on the activities of yet another small linguistic sub-specialization, or even of four such. Rather it illustrates four approaches to the nature of discourse itself, using contact between languages and cultures as opportunities to help characterize the supporting knowledge and skills. The four are Translation Studies, Discourse Analysis, Rhetorical Taxonomy, and Contrastive Rhetoric. Each of these is an established practice, with its own literature and history. Moder (forthcoming) sees them as convergent, which is encouraging, since each has more to lose from isolation than what it might gain by converging.[1]

There were more good papers than can be mentioned here. The following are some that seemed particularly interesting and worthy of wide attention.

In Translation Studies, Sonja Tirkkonen-Condit presented a very interesting challenge to the common notion that translated text inevitably bears the marks of its origin. In a study involving over 1000 text judgments, the probability of a text being correctly judged as being a translation was 'hardly higher than by chance'. A follow-up study focused on the linguistic features of particular texts that were misjudged most often (as being translations when they were not, or not so when they were).

The studies support each other. Tirkkonen-Condit makes a strong case for the notion that when translation quality is high, 'translationese' is a myth.

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[1] In preparing this report I have made extensive use of Carol Moder's excellent interpretive overview of the Symposium. Most of the Symposiums, nearly annual since 1972, have produced corresponding books or edited collections of papers.

At the opposite end of the scale of academic abstraction, Brad Davidson presented a fascinating report on the practical cross-cultural realities of being a staff translator in a large hospital.

In Discourse Analysis, Wallace Chafe presented fascinating interactions between discourse factors in text—for example, syntactic control over the introduction of given and new information and polysynthetic morphology. There are consequences for any translation that moves text across the boundary, especially when translating into a polysynthetic language. The freedoms to control ordering that are found in more isolating languages are not all present, which affects the potential of discourse structures. A range of examples from Seneca and English shows how the polysynthetic Seneca tends to use verbs instead of English adjectives, copula structures, and adposition elements, e.g. for expressing location. It has many concatenative structures but no embedding. Chafe shows how one of the properties of polysynthetic patterning is an obscuring of the boundary between syntax and discourse.

The notion of image schemas (Johnson 1987, Lakoff 1990) was brought into more than one paper. They represent the growing interest in cognitive linguistics. Tania Gastao Sailes presents this cognitive orientation in 'The communicative text'.

An important strength of these schemas is that they give an explicit place, under the orientation of the writer of a text, for the writer (self presentation), a diversity of abstractions concerned with the language used, overall goals of the text, and an explicit view of the reader. Interactions between reader and text can be made explicit, and discourse can be seen along with links to the goals which it seeks to satisfy.

A worrisome feature, perhaps a weakness, is that some of the terminology seem to perpetuate the notion that communication is simply message passing, and that its messaging functions can somehow be separated from the speaker, the hearer, and the language community, and validly studied in a disconnected fashion. One can hope that such suggestions from the terminology do not become embedded in the claims which constitute results.

Another paper using image schemas was 'Episodic boundaries in Japanese and English narratives' by Mary Digennaro-Seig. Using a picture book without captions, a frog story (Berman and Slobin 1994), Japanese and American adults told the story. Their conceptualizations of the story differed in a patterned way, as represented by the episode boundaries in their presentations. The language used also differed, and these patterns varied somewhat depending on whether the pictures were laid out on pages as a book or alternatively presented on a continuous scroll.

Although Robert Longacre was unable to attend, his paper 'Holistic textlinguistics' was presented. He uses selections from a novel to explore the interactions of large-scale text linguistic elements, such as the development of narrative in a chapter, with elements closer to the level of syntax. The paper stands as an appeal for the kind of analysis and understanding of text that does not focus exclusively on either large or small scale, but rather integrates the whole range from the beginning.

The papers on Contrastive Rhetoric were the most numerous, and so only a few are highlighted.

Lafi Alharbi studied texts from native Arabic speaking and English speaking writers, and also from nonnatives. The texts were all Letters of Job Application. Alharbi identifies 'form protocols' and 'content protocols' to look for in the various letters, and seeks to examine the effects of different protocols on cross cultural communication, and finding that rhetorical transfer marks nonnative writing to a statistically significant degree.

Ruth Berman studied a number of suspected correspondences between phrase level and discourse in 'Phrase-level complexity as a discourse diagnostic'. Texts by Hebrew or English speaking children writing two different varieties of discourse—personal narratives about fighting vs. expository texts on the subject of violence in schools were examined. Frequencies of use of different nominal forms, tense and verb forms and structural complexities vary strongly both with the age of the writer and the kind of discourse written. Many previously suspected relationships were explicitly confirmed (Berman & Slobin 1994).

Discussion of this paper brought out a surprising aspect—that the children, even the older ones from their 9-16 year old range, had unexpectedly poor capability to produce expository discourse. Ability to control abstract expository speech is apparently easy to presume, but much scarcer than academics commonly expect. This tendency surely has consequences in translation, especially the sort of translation that SIL often encounters in barely literate cultures. Assuming that particular local translators are fluent in creating or judging expository text may simply be wrong. Such translators often have had a smaller amount of direct experience with expository text than Berman's 13 or 16 year olds.

Suzanne Fleischman and Marina Yaguello have given a stimulating new understanding of English and where it is going. In 'Discourse markers across languages?: Evidence from English and French', they have focused on *like* and corresponding terms in French. In 'Discourse marker use in native and non-native English speaking Korean Americans', Hikyoung Lee focuses on *well*, *you know*, and *like* along with corresponding Korean phrases. Fleischman and Yaguello note a number of parallel developments between *like* and *genre* in French. 'This striking functional parallelism raises questions about diachronic parallelism...' It also raises interesting questions about an underlying functional unity of some sort. *Like* is developing a kind of function that in some ways resembles evidentials, reporting inner states through an interesting variety of inner speech—a speech that is not spoken. They reference a paper entitled 'I'm like, 'say what?!': A new quotative marker in oral narrative' (Blythe et. al. 1990). The common lexical function of *like* to express resemblance seems to be buried in a pile of other functions, somehow derivative, richly communicative and not yet sorted out by either the communication sciences or the speakers and hearers.

There were many other fascinating papers in Contrastive Rhetoric (the largest group)—far too many to mention each. Many other sorts of culture boundaries, varieties of text and collections of languages have been compared. Broader topics, including language history, intellectual property, politeness, negotiable cultural identity, advertising, and green politics have also entered in.

Recognizing the many positive contributions of this collection, it is still possible to wish, to think about the Symposium and its supporting sciences and say 'How could this have been even better in some similar but slightly adjusted world?'

A strong wish for the Symposium would be this: All of the contrasts of culture, language, rhetorical differences, variations with language task have behind them common basis notions of what is the shared foundation which the contrasted performances have in common. Behind Contrastive Rhetoric there is a notion of Rhetoric. The contrasts are meaningful only in context of the Rhetoric that they share.

Different assumptions will lead to differing interpretations, and most important, will assign different significances for the work—so they have strong consequences.

Not all assumptions are equally credible, and the collections of assumptions we use are surely incompatible. Even the collection of assumptions that I use in one day's work is surely not well conceived and consistent. Making it more consistent is sometimes important and sometimes might save a great deal of poorly founded work. We can only improve on these foundations if we identify the ones that we are using. Often when articulated they will be weak and indefensible, simply the best available.

Contrastive Rhetoric has the power to favor some assumptions and make others doubtful, but only if results and explicit assumptions appear together.

Such papers are hard to write, the work that they represent is made harder by a desire to identify assumptions, and the identification of assumptions cannot be simply an added ingredient after the study is done. It must be in mind from the beginning. Even so, the added work would produce added value, sometimes very high added value. Occasionally, as in the papers of Gastao Sailes and Digennaro-Seig using 'image schemas', it appears.

Perhaps the best way to end this recitation of wishes is to quote from a kindred spirit, namely Moder in her excellent overview of the symposium:

> All of the approaches and paradigms represented here today have sought to answer broader theoretical issues, not just about spoken narrative, or about written academic research papers, or about how to translate a specific text but about THE NATURE OF DISCOURSE. An overview of these questions would include the following:
>
> - How is conscious experience translated into discourse?
> - How are foregrounding and backgrounding accomplished?
> - What is the function of features like lexical choice, referential choice, definiteness, and subjecthood and how are they realized?
> - What are the effects of different organizational structures?
> - To what extent are discourse patterns based on cultural values?
> - To what extent are discourse patterns based on the linguistic forms available in a language?
> - How can these cultural discourse patterns best be learned?
> - How can they be translated?
>
> If we wish to answer these questions, we need to move beyond individual disciplines and particular research paradigms to search for BOTH THE COMMON AND DISTINCT FACETS of discourse across language and cultures.

A Symposium book is planned, to be published by Benjamins.

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Reviews

Principles and Parameters: An introduction to syntactic theory. By PETER W. CULICOVER. New York: Oxford University Press. 1997.
444 pp. Paper $27.50

Reviewed by MARVIN BEACHY
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This is a textbook intended for classroom use, but it would also be useful for any field linguist who wants to stay abreast of important trends in syntactic theory.

The underpinnings of the Principles and Parameters theory are articulated well in the first chapter, Foundations and Methods. The titles of chapters 2-9 give a good overview of the subjects Culicover (C) covers: Arguments, Government, and Case; Binding Theory; A-Movement; 'X'-Theory [read as X bar Theory]; 'A'-Movement; Barriers; LF [Logical Form] Representations; and Binding and Logical Form. The last chapter, Head Movement and Minimalism, includes introductions to a few more recent proposals: Chomsky's Minimalist Program, Larsonian shells, and Kayne's Antisymmetry theory.

Field linguists whose grammar training was based on other models may wonder why the Principles and Parameters model should interest them. Besides the fact that one needs at least a cursory knowledge of the theory to understand much of today's linguistic literature, there is another reason I think this model should be of interest. As stated below, the theory's lofty goal is to find a Universal Grammar innate in all humans (p. 4):

> The Principles and Parameters view is that much of this knowledge [that native speakers have of what is and is not grammatical] is not learned, but is an intrinsic part of the human mind. But if some knowledge of language is built into the human mind, it must be built into all human minds, and must therefore be universal. On this view, languages are not all that different, deep down, and what we may perceive as profound variations are just minor ones: different words, different sets of sounds, differences in the order of words within phrases, and so on. The universal knowledge concerns the PRINCIPLES that determine the basic architecture of any linguistic system, and the PARAMETERS that govern the range of variation that this architecture may display.

Especially helpful to those unfamiliar with the theory are the substantial sections on further reading at the end of each chapter. Each reference is conveniently marked for its level of technical difficulty. Also helpful are the Glossary and the Solutions and Hints to Selected Exercises.

C's approach throughout the book is refreshingly honest. He gives recurring reminders that he is describing syntactic THEORY, not watertight, established facts. This is exemplified on page 347 where he addresses Chomsky's Minimalist Program (MP):

> … the Minimalist Program is intended to be a significant departure from what has gone before. MP takes as its point of departure the hypothesis that D-structure, S-structure, the government relation, the X' schema, and referential indices play no essential role in syntactic theory and must be dispensed with. Taking this step places a great burden on the theory and the theorist, given the central role that those concepts have played in earlier work. Whether the MP approach is on the right track will only become clear after some time has passed …

Principles and Parameters, the theory, is a track worth knowing about, and *Principles and Parameters*, the book, is an excellent place to start getting on track with the theory.

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The Structure of Dagaare. By ADAMS BODOMO. Stanford: CSLI
Publications. 1997. 159 pp. Hardback $34.95.

Reviewed by MICHAEL CAHILL
SIL—International Linguistics Coordinator

Adams Bodomo (B) has done linguists a great service by writing this book, especially those specializing in West African languages. *The Structure of Dagaare*, hereafter abbreviated as SOD, is an overview of this Gur language spoken in northwestern Ghana and adjoining Burkina Faso, and benefits from both B's linguistic abilities and his insights as a native speaker of this language. The literature on Gur languages in general is sparse, with very few other book-length works available—Carlson's (1994) work on Supyire being one of the most thorough. A previous study of Dagaare that B refers to fairly often is Kennedy 1966.

For the person not familiar with structures of a West African language, let alone Gur, B gives a good sketch of what can be expected. For the most part, the content of SOD is descriptive; linguistic theory is referred to in only a few places, making the contents quite accessible, and probably more enduring (theories fade, but the data endures…).

The contents of SOD are as follows:

Introduction: The Dagaare language and its speakers
1. The vocalic and consonantal systems
2. Suprasegmental phonology: Tone
3. Phonological processes: Vowel harmony
4. The Dagaare syllable: Types and structure
5. An orthography for Dagaare
6. Word order parameter and Dagaare syntax
7. Syntax of the Dagaare nominal phrase
8. Morphology of the Dagaare noun
9. The pronominal system of Dagaare
10. Nominal processes in Dagaare
11. Structure of the verb phrase
12. The preverbal particles
13. The main verb
14. The post-verbal particle *lá*
15. Adverbs and adjuncts
16. Double object constructions
17. Complex constructions: SVCs
18. Complex constructions: SVNs
19. Complex constructions: Coordination
20. Other syntactic alternations

Appendix: Vocabulary list

In a book of only 159 pages covering the breadth of topics above, the predictable complaint is that there is not as much depth to each topic as a specialist would wish. For instance, I looked in vain for any mention of associative (i.e. possessive or genitive) noun phrases. As a phonologist, I keenly felt the need for more details in the phonology chapters, and morphology or syntax specialists no doubt would feel the same in their areas. Some topics, however, are covered in much more detail than others. In this review, the discussion is grouped into the areas of the people, phonology, morphology, and syntax, with some general remarks at the end.

Dagaare speakers, the Dagaaba, exist in a real world outside of phonemes and syntactic structures, and I appreciate B's discussion of their life situation, not often found in linguistic works. In the 'Introduction', B gives a sketch of the political structure, economics, and various dialects of the Dagaaba. Ch. 5, on orthography, shows the real tensions that orthography proposals face between pure linguistics and computer technology on one hand, and historical and political factors on the other. I would like to have seen social factors discussed as well, e.g. what average Dagaabas or their leaders think of various proposals and why.

Chs. 1-4 cover basic phonology of Dagaare: what the consonant and vowel phonemes are and what the tones and syllable structures are. These are short chapters. The consonants that B labels 'voiced glottal implosive', 'voiced [lateral] implosive', and 'labial implosive' invite more discussion for readers unfamiliar with these. The reader should be aware of non-IPA usage of some symbols, e.g. [?] rather than [ʔ] for glottal stop, [ɦ] for 'voiced glottal implosive' rather than voiced glottal fricative. Dagaare is a two-tone system, with downstep, and tone is shown to carry both lexical function (e.g. differentiating some verbs only by tone) and grammatical function (the sentences 's/he will not go' and 's/he should not have gone' are minimal tone pairs). ATR harmony exists within a word and at least one verbal suffix exhibits roundness vowel harmony. The low vowel /a/ is neutral in both processes. B distinguishes between primary and secondary syllables, but unfortunately never makes clear the distinction between the two.

Morphology of Dagaare is covered in Chs. 7, 8, and 10 for nouns, and Ch. 9 for verbs. Ch. 7 is misleading labeled as 'syntax'; actually, B spends most of his time there showing that noun-adjective complexes are really single words, and this probably could have been discussed more appropriately under Ch. 8. Ch. 8 extensively discusses the noun class system of Dagaare, based on singular and plural suffixes using an abundance of data. B goes into some theoretical detail here, showing how his system fits into the Lexical Phonology model. All nouns are fully marked for tone in this section. Ch. 10 shows the derivational morphology of nouns, in particular, nominalization of verbs and adjectives, 'compounding' (which seems to be identical to the noun-adjective sequences discussed earlier, rather than noun-noun compounds that exist in other Gur languages), and 'nominal incorporation', which includes a noun and verb together in one verb, as in 'to water-drink'. The examples of 'pronoun-verb incorporation', however, appear to be merely cases of vowel elision and could have been more suitably included under phonology.

Dagaare is basically an SVO language, though serial verb constructions cloud this simplistic view. After establishing this SVO structure in Ch. 6, B deals with nominal morphology, already discussed above, then lists and exemplifies different types of pronouns in Ch. 9. The basic verb phrase, consisting of the verb and particles before and after, is illustrated in chapter 11, with further chapters on the pre-verbal particles and the post-verbal particle *lá*. The latter particle, labeled a factitive or affirmative marker by B, has no counterpart in English, and the discussion of its properties is one of the more distinctive topics in the book.

The category of 'adverb' has always been a bit slippery, and B's discussion of 'adverbials' in Ch. 15 is a catch-all category encompassing a wide variety of words and functions, including position, time, manner, intensity, negation, etc. B shows in some detail how spatial locations are expressed with what may be termed postpositions, which are derived from body parts.

In Ch. 16, B illustrates ditransitive sentences, such as 'He gave Dere the book', but notes that another way to express the same idea is with serial verb constructions (SVCs) such as 'He TOOK book GAVE Dere'. Ch. 17, on SVCs, is one of the more in-depth and useful chapters, and could serve as a basic introduction to SVCs for those unacquainted with the construction. He discusses and illustrates the fact that both verbs in an SVC must have the same tense, aspect, mode and polarity. He also notes the small but real semantic difference produced when a conjunction is inserted between the verbs ('He took book AND gave Dere').

What B labels 'serial verb nominalizations' in Ch. 18 is perhaps the most original contribution of the volume. In it, he combines insights from nominalization and serial verb constructions, illustrating the nominalization of a serial verb construction.

Rather than placing compound noun and verb phrases in their respective syntax chapters, B displays all compound phrases in one place, in this case Ch. 19. There are four words for 'and' in Dagaare, and B clearly lays them out, and the specific syntactic constructions they occur in are compared side by side. Contrary to the title, some subordinate constructions are also discussed here, while relative clauses and questions are discussed in the final chapter. Also discussed is the most overtly theoretical area, relating reflexivization and Chomsky's binding principles A, B, and C (see Black 1997 for an accessible explanation of these). Finally, though Dagaare has no true passive voice, B presents two constructions, a left dislocation and a 'medio-passive', which can fulfill the same function.

While most of the disappointment in SOD comes from what it omits, there is one type of inclusion that is also questionable. Data from other languages (Akan, Ewe, Hausa, Yoruba, Mampruli, Moore, and even Norwegian!) is fairly frequently brought up to exemplify Dagaare structures. Most of these do not make any contribution to Dagaare and could easily have been omitted with no loss.

For anyone interested in tone or merely accurate pronunciation of the examples, it is unfortunate that tones are not marked in any of the chapters on syntax, which is more than half the book. Another potential source of confusion is that B generally uses the official Dagaare orthography rather than in phonemic transcription. For vowels this is confusing: for example, on the basis of what is said in the vowel harmony chapter, the form written as *daazeɛ* 'pito drink' is probably actually *daazɪɛ* .

There are also a fair number of typos and text flow problems, but these are relatively minor.

I see two main contributions of this work. First is the challenge to theory and typology that data from a relatively unknown language presents. For example, B notes that there are full, well-formed sentences in Dagaare which have no overt verb, such as *bader lá*, roughly 'that is spider', where *lá* is the factitive marker often used after overt verbs. Theories of syntax which regard the verb as central are challenged by this. B also believes there is a connection between the function of verb serialization and verbal affixation, and predicts a language with rich verb serialization will have a correspondingly poor verb derivational system and vice versa; this suggests an agenda for cross-linguistic research.

The other contribution of B's work is, as mentioned briefly earlier, that this work gives an admirable, though concise, snapshot of an entire language which is not widely represented in the literature. Sources on Gur languages are scarce, and some of the ones which give a fairly complete look at syntax, for example, Jacobs (1970) and Spratt and Spratt (1972), while more detailed in some respects, are not as reader-friendly as SOD. For someone who wants to get a feel for what Gur languages or West African languages in general are like, B's book is a very good starting point.

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Russian Learners' Dictionary: 10,000 words in frequency order.

By NICHOLAS J. BROWN. 1996. London and New York: Routledge.
Pp 429. Paper.

Reviewed by JOHN M. CLIFTON
SIL—North Eurasia Group and University of North Dakota

Many fieldworkers are involved in compiling a dictionary; some are also involved in preparing materials to help others learn the language they have spent so much time studying. This dictionary is a good example of how to combine the two activities. As an added bonus, the 'Introduction' contains an excellent discussion of how to use a corpus to determine what words to include in such a dictionary.

As noted in the subtitle, the words in this work are meant to include the 10,000 most common words in Russian. Brown (B) used two studies of frequency in Russian as the primary sources of information regarding word frequency, each of which was based on a text corpus of one million words. The particular words in this dictionary were not, however, compiled mechanically from these lists. In the introduction B justifies not including some of the words in the lists on the basis that they occur in a limited number of texts. This discussion includes a clear presentation of the difference between absolute and modified frequency. B also justifies including words which do not appear in either list on the basis that both corpuses were skewed in favor of written language. It could be legitimately argued that these problems are the results of problems with the corpuses. But this is precisely the point—a researcher must be aware of these potential problems while constructing a corpus. And since most fieldworkers will be working with a corpus that is less than perfect in many respects, knowledge of these issues will help in recognizing and overcoming these deficiencies.

The body of the dictionary consists of the 10,000 words with definitions. While the overall arrangement of the entries is according to frequency, beginning with word 2009 blocks of entries are listed in alphabetical order. The words within each block are essentially equally frequent. I feel this correctly reflects the fact that while the frequency of the most common words in a language will not vary greatly from one text corpus to another, the frequency of less common words is highly dependent on the particular corpus. Attempting to arrange all the words in order of frequency gives the learner a false sense of statistical signficance.

The first 600 lexical entries are arranged in five columns: the entry number, the lexical entry, the definition, an example, and the gloss of the example. B comments that 'a Russian beginner learning the first few hundred words of the language needs exemplification more than morphological detail' (9). Thus, while morphological information is included in the lexical entry column (gender for nouns, aspect (perfective or imperfective) for verbs, the related aspectual form for verbs, cases governed by prepositions and verbs, and paradigmatic irregularities), the examples hold a more prominent position than does the morpological information.

After the first 600 entries, examples are only given when B feels a short definition is insufficient. (The definitions throughout the dictionary are basic translation-equivalences.) These entries are arranged in four columns: the entry number, the lexical entry, the definition, and everything else. The basic morphological information is still included with the lexical entry: gender for nouns, aspect for verbs, and cases governed by prepositions and verbs. Other morphological information is listed in the fourth column along with examples (where necessary) and particular phrases including the lexical item.

The book concludes with an alphabetical index. The index is alphabetized according to the Russian entry, not the English definition – there is no English 'finder list' or 'reverse dictionary'. Each entry in the index is arranged in three columns: the lexical entry, the entry number in the main dictionary, and the definition. The lexical entry includes just the basic morphological information normally included with the entries after the first 600.

This dictionary is limited in its scope, but that is not a deficiency. Its target audience is students learning Russian vocabulary who want to learn the most common words first. This accounts for the fact there is no English 'finder list' or 'reverse dictionary'—these students are oriented towards the Russian lexical items. It also accounts for the fact that the dictionary does not give collocations to differentiate various senses—students would need to find this information elsewhere. From the 'Introduction' to the 'Index', this dictionary provides a good example for fieldworkers interested in making basic lexicological information available for language learners.

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Indefinite pronouns. By MARTIN HASPELMATH. Oxford Studies in Typology and Linguistic Theory. Oxford: Oxford University Press. 1997. Hardback $72.00.

Reviewed by FERDINAND DE HAAN
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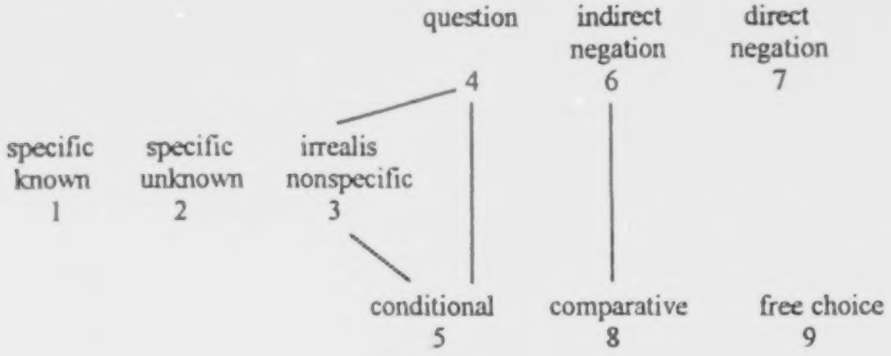
Indefinite pronouns by Martin Haspelmath (H) is the first book in a new series which aims to provide a functional-typological perspective to linguistic problems that are of both typological and formal importance. One couldn't wish for a better first book to inaugurate the series. Drawing on insights from both functional-typological and formal linguistics, H manages to give a convincing cross-linguistic analysis of indefinite pronouns. The book is highly recommended, not only to field workers who will find that this study contains enough theoretical predictions to test against the indefinite pronoun system in the language or languages they are working on, but also to any linguist who wants to see a textbook example of a linguistic analysis. This does not mean that H presents an analysis for every detail in every language (H states so freely); there are enough loose ends for further study and field workers may want to investigate these areas. H always gives the relevant information for hypothesis testing—another big point in the book's favor.

The book consists of three main parts. The first part (Chs. 1-3) is devoted to an overview of the study and definitions of the area covered in the analysis. H defines indefinite pronouns as those pronouns '... whose main function is to express indefinite reference' (11). This sounds like a circular definition but it actually does the job because it includes such pronouns as (English) *some* and *any* and their compounds, while the definition excludes quantifiers (*few, many, all*), generic pronouns (*one*), and identity pronouns (*other, same*). Although the latter groups are sometimes included in the indefinite pronoun group, their main function is not one of indefiniteness. The study uses two samples. The main sample is a 40-language sample for which H has more or less complete information but is areally and genetically unbalanced. This is H's main database. The second sample is a balanced 100-language sample but the information is much sketchier. Some may argue with the use of an unbalanced sample but this is not regarded as a problem. The emphasis on constantly using a balanced sample in typological studies has been overstated. Sometimes it just is not possible to have a balanced sample, either because the information is lacking in reference grammars (as seems to be the case here), or because the phenomenon under investigation is not present in some areas or language families.

Formally, indefinite pronouns are formed from interrogatives, generic nouns or (rarely) the numeral 'one'. To these base forms an indefiniteness marker (like English *some-* or *any-*) is added. Almost universally, indefinite pronouns are derived forms. Functionally, indefinite pronouns are used to express negativity (as in English *nobody*), negative polarity, specificity/unspecificity ('a certain...') and the expression of free choice ('pick *anyone*'). These functions are universal.

The second part (Chs. 4-5) is devoted to the introduction of the semantic map, shown in (1) below, and its explanation on both functionalist and formal grounds. The map aims to capture the different functions of indirect pronouns as well as the semantic development of indefinite pronouns. There are nine universal functions but individual languages may subdivide each function into two or more separate functions.

(1) Semantic map for indefinite pronouns.



The map does not allow for discontinuous elements to occur, e.g. a morpheme with functions 1, 2 and 5, but not 3. Indeed, such discontinuous elements do not occur in any language in H's sample. For instance, the English indefinite pronoun *some* is used for functions 1 through 5, while *any* can be used for the functions 4 through 9 (and *no* is used for 7 only). This shows that there may be overlap but no discontinuity. Another example is Ossetic (an Iranian language) which has four indefinite series: *-dær*, for function 1, *is-* for 2-6, *ma-/ni-* for 7, and *–dæriddær* for functions 8 and 9. Fascinatingly, in the 40-language database, no two languages—however closely related—follow the exact same pattern. This is remarkable, given the close genetic relations between many of these languages.

The final part (Chs. 6-8) deals with the diachronic sources for indefinite pronouns. H identifies four grammaticalization processes for non-negative indefinite pronouns: the 'I don't know' type which develops into function 1 on the map above, the 'want', 'it may be', and 'no matter' types, all of which develop into free choice indefinites. These indefinites may be more or less grammaticalized and can in turn acquire other nearby meanings.

Another possibility is the development of indefinite pronouns out of scalar focus particles like *even* and *at least*. This occurs in many diverse languages such as Indonesian, Even, Kannada, and Japanese. The connection between scalar focus particles and indefinites is derived via the 'want/it may be' grammaticalization path but this is found less convincing than H's other explanations. Other sources include the conjunction 'or', bare interrogatives (which then are differentiated between their indefinite and interrogative uses via inflectional and syntactic means), and reduplication of interrogatives. All these are widely attested.

The penultimate chapter deals with negative indefinites such as *nobody* and *nothing*. Many studies are now available on the subject, yet H manages to avoid repeating the same old material. He adds significantly to our understanding of negative indefinites by taking a diachronic perspective that combines known forces of grammaticalization (e.g. Jespersen's Cycle, the process of weakening and subsequent reinforcement of the sentence negation) with new ones. This way, the presence of languages such as the Germanic family can be explained where negative indefinites are not accompanied by a verbal negation (e.g., *I saw nobody* in English) and explain why this pattern is very rare among the world's languages. The most common pattern is the Slavic pattern which requires a verbal negation. Romance languages such as Spanish are a cross between these two types. Depending on the grammatical construction, a verbal negation can be either present or absent in these languages.

The final chapter is a summarizing one. There are two appendixes with detailed information regarding the two samples, an extensive bibliography, and an index.

It is well known that languages that are closely related can nevertheless differ in subtle respects. One such example is the subtle differences in word order in the Continental West Germanic languages German and Dutch. Much has been made in the literature about these subtle differences, but nobody has given a convincing analysis of these differences that matches the clarity of H's analysis of indefinite pronouns. Anyone working on two or more closely related languages should be required to read this book.

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Linguistic semantics: An introduction. By JOHN LYONS.
Cambridge: Cambridge University Press. 1995. 376 pp.
Hardback $54.95, paper $18.95.

Reviewed by E. LOU HOHULIN
SIL—Academic Affairs

Lyons (L) began this book as a revision of his textbook *Language, meaning and context*. As he revised, he added new sections, rewrote and expanded others in order to cover recent developments in semantics. In this book, L has given more space to sentence-semantics and utterance-semantics than he has to lexical semantics. His reason for doing this is to show how lexical and non-lexical meaning fit together and are interdependent. He felt it was necessary to give evidence that the meaning of sentences has always been central in formal semantics and that formal semantics, even with its limitations, has achieved a great deal. One of his principal aims in writing the book was to show how formal semantics can be integrated within the broader field of linguistic semantics. On the other hand, he also wanted to show that formal, truth-conditional semantics, as currently practiced, cannot satisfactorily handle the non-propositional meaning encoded, lexically or grammatically, in the sentences of particular natural languages.

The book has a total of ten chapters categorized into four parts: 'Setting the scene', 'Lexical meaning', 'Sentence meaning', and 'Utterance meaning'. Ch. 1 'Metalinguistic preliminaries' is the only chapter in Part 1. It is the longest chapter in the book, and has, by L's own admission, some difficult material. However, as one reads through the book, it is clear that the information in this chapter is foundational for understanding the organization and content of the other chapters. In this chapter, he introduces and discusses the definition of meaning, semantic metalanguage, the difference between linguistic and non-linguistic meaning, language vs. speech, form and meaning of words, and text and discourse.

In Ch. 2, Part 2, L discusses lexical meaning in terms of homonymy, polysemy, and synonymy. He makes the point that however one draws the distinction between the lexicon and the grammar in general linguistic theory, in the description of a particular language the two must be seen as complementary and interdependent. Those of us who have compiled dictionaries and written grammars recognize that the very complementarity and interdependence of the lexicon and grammar are at the bottom of the ambivalence we often feel about making decisions regarding where to put data—the dictionary or the grammar.

Defining the meaning of words is the main topic of Ch. 3. L addresses denotation, reference and sense, words that denote natural kinds, and semantic prototype theory. He tries to show that none of the proposals for the definition of words is adequate in and of itself. He believes, however, that much can be learned by trying to formulate definitions precisely within the framework of modern theories of grammatical and lexical structure of languages.

In Ch. 4, entitled 'The structural approach', L presents the idea that the lexical structure of language can be regarded as a network of sense-relations, and discusses the two kinds: substitutional (paradigmatic) and combinatorial (syntagmatic). In a helpful discussion on componential analysis (lexical decomposition), he states that although the standard or classical version coupled with assumptions of universality is indefensible, it is of historical importance and still quite widely accepted. He goes on to say that this type of analysis is not necessarily in conflict with other approaches to structural semantics, but can be considered fully compatible with them, in principle. This chapter also contains a fairly thorough, though necessarily brief, discussion of entailment because L believes it plays an important role in all theories of meaning.

There are two chapters in Part 3. Ch. 5 covers meaningful and meaningless sentences. L believes that sentences are, by definition, grammatical. Therefore, meaningless sentences are semantically ill formed—not ungrammatical. He discusses sentences that are literally meaningless, but may be interpretable on the basis of the principles of metaphor, metonymy, or synecdoche. On the other hand, L believes that there are three types of utterances: those that are grammatical and meaningful, those that are ungrammatical and meaningless, and others that are fully grammatical and perhaps also meaningful—but unacceptable.

In this chapter, L also introduces his readers to the reasons why he believes the intuitive connection between meaning and truth has been explicated and exploited in modern linguistic semantics. He claims that the truth-conditional theory of meaning is central to all modern versions of formal semantics. He explains that truth-conditional semantics is related to the verificationist theory of meaning that had been expounded by language philosophers historically and was grounded in logical positivism. It is interesting that although L believes that verificationism as a philosophical doctrine is all but obsolete, he thinks that there is evidence in present day formal semantics of its positivist origins, which he traces through the verificationist theory of meaning. He believes that this creates certain problems for truth-conditional semantics. He says, 'If the truth-conditional theory of semantics is so formulated that it rules out what seems to be a genuine indeterminacy in the semantic structure of natural languages, it may be rejected without more ado' (149). L does not, however, feel that it needs to be formulated in this way.

L considers Ch. 6 'Sentence-meaning and propositional content' to be pivotal in the structure of the book. He discusses the influence of logic on linguistics and vice versa. He answers the question 'Is there nothing more to the meaning of a sentence than its propostional content?' by discussing thematic meaning, simple and composite sentences, truth functionality related to conjunction, disjunction, implication and negation and non-declarative sentence types. With a careful use of sentence examples and a precise delineation of the problems involved in interpreting their meanings, he demonstrates the inadequacy of treating natural languages within the framework of standard propositional logic.

In Ch. 7 'The formalization of sentence meaning', L reviews two historically significant and influential theories of sentence meaning: the Katz-Fodor theory of meaning (associated with the classical version of Chomsky's TG) and one version of possible-worlds semantics developed by Montague and his followers. He gives a selective and what he considers to be a non-technical overview of the Katz-Fodor theory. He ends his discussion by saying that most linguists who are interested in either generative grammar or formal semantics are now working within a quite different theoretical framework. L then compares the Katz-Fodor theory and Montague grammar. At one point in the chapter, he claims that Montague grammar is resolutely truth-conditional. He goes on to say that unlike certain other truth-conditional theories, Montague semantics operates with a particular notion of 'relative truth', rather than 'absolute truth'. L explains that 'relative truth', called truth-in-a-model is an attempt to formalize the distinction that he himself draws between propositions and propositional content.

In Part 4 'Utterance-meaning', Ch. 8 covers speech acts and illocutionary force. L believes that most speech acts are culture-specific, but also says that there are others that are widely assumed to be universal. They include making statements (or assertions), asking questions and issuing directives. He says that it has been argued, on philosophical grounds, that these three classes of illocutionary acts are not only universal, but also basic. Basic has two senses in this context. The first sense is that no human society could exist in which acts of this kind have no role to play; and second, that many, if not all, culture-specific illocutionary acts can be seen as belonging to a more specialized subclass of one of the three basic classes. He makes the point that although the theory of speech acts is sometimes advocated, or criticized, as if it were an alternative to truth-conditional semantics, the two theories are, in principle, complementary. Truth-conditional semantics, as it is currently applied to natural languages is a theory of the propositional content of sentences; speech-act theory deals with the illocutionary force of utterances.

In Ch. 9 'Text and discourse: Context and co-text', L acknowledges that sentences in the more abstract sense are theoretical constructs, postulated by linguists in order to account for the grammaticality of certain potential utterances and the ungrammaticality of others. He assigns the term 'system-sentences' to them and says that they are what are generated by the grammatical rules in a generative grammarian's model of some language-system (operating upon a vocabulary, or lexicon, which is part of the same language-system). L uses the term 'text-sentence' to refer to the more 'concrete' sentences that may express whole texts or segments of texts. He also discusses the difference between cohesion (form) and coherence (content), and the difference between logical notions of implication and entailment and Gricean notions of implicatures—conventional and conversational. He claims that context determines utterance-meaning at three distinguishable levels in the analysis of text or discourse. Context 1) makes clear what sentence has been uttered, 2) makes clear what proposition has been expressed, and 3) makes clear the illocutionary force. Context is also highly relevant to what is implied.

In Ch. 10 'The subjectivity of utterance', L discusses reference as a context-dependent aspect of utterance–meaning. It is a relation that holds between linguistic expressions and what they stand for in the world (or the universe of discourse). He defines deixis as a particular kind of reference that depends crucially upon the time and place of utterance and upon the speaker's and addressee's roles in the utterance-act itself. He also discusses two logically separate components of definite descriptions that give rise to two different kinds of presuppositions: existential and sortal (or categorial). For example, whoever uses the expressions 'the woman' or 'the man' in what we may loosely call an ordinary context is committed to the existential presupposition that the referent exists and the sortal presupposition that it is of a particular sort, or category—the category of persons. He goes on to discuss the violation of an existential presupposition as in the example 'The (present) king of France is bald'. L holds to the idea that reference is intrinsically connected to existence.

This chapter seems to me to be the crux of nearly all L has to say about sentence meaning vs. utterances, and reference vs. sense. It is in this chapter that he deals with things like aspect and modality in terms of semantics and ontology. He says, 'Throughout the book I have adopted the viewpoint of naive realism, according to which the ontological structure of the world is objectively independent both of perception and cognition and also of language' (324-5).

One of the strengths of this book is a section with excellent suggestions for further reading. Also, the index is especially user-friendly in that important topics or terms are printed in bold. The bibliography, in true Lyons fashion, is extensive and shows his broad interests and scholarship.

Although L is more committed to the idea of 'autonomous linguistics' than I am, I appreciate his attempt to bridge the gap between formal linguistic models and the communicative models we need for the applied linguistic tasks involved in field linguistics programs. His understanding of the philosophical ideas that underlie linguistic theory makes him a competent builder of sturdy and stylistically elegant bridges. This book is another monument to his gift for building bridges. I recommend it for the shelves of all who care about linguistic theory bridge-building.

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Talk is cheap: Sarcasm, alienation, and the evolution of language. By JOHN HAIMAN. New York: Oxford University Press. 1998. 220 pp. Cloth $45.00, paper $18.95.

Reviewed by MARSHA HOWLETT
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John Haiman (H) is a Professor of Linguistics at Macalester College in St. Paul, Minnesota. He has written several books about language, including *The Rhaeto-romance languages* (co-author, 1992) and *Natural syntax* (1985).

In a comprehensive 'idiosyncratic personal essay' (191), H marches through philosophy (postmodern), linguistic theory (he is a functionalist), and contemporary culture (his favorite thinkers are Ivan Fonagy, Jorge Luis Borges, and Dave Barry). This book is a cultural study on the postmodern divided self as illustrated by the self-consciousness of speech. Linguists understand this dissociation (191):

> For we not only have substituted talk for action but have gone one step further than artists and other academics and (along with critics, parodists, and philosophers) substituted TALK ABOUT TALK for talk itself.

H's topic is the 'INSINCERITY and the INCONSEQUENTIALITY of language'. (7). The first section deals with sarcasm, which along with irony, the put-on, the guiltative and affectionate insults are ubiquitous in the modern American culture. H uses examples from other languages to show the universality of sarcasm—a speech mode that is patently insincere.

H expands his thesis to include other examples of artificiality: sententiousness, affectation, ritual language, and politeness (10):

> [W]hat distinguishes them from metaphor, is the idea of the speaker as a divided self: more specifically the speaker's self-conscious alienation from the actual referential content of his or her message.

Linguistic self-consciousness also reveals itself in the pronoun 'I'. The reflexive then becomes a grammatical sign of the divided self.

According to some linguists, plain or sincere speech is the norm in conversation. H demolishes this theory by using cliched examples like 'ordinary people' and 'the noble savage'. The *reductio ad absurdum* of his argument is the elevation of the 'strong, silent type' (106):

> It's only one step from the idealization of four-letter words to the worship of total silence and the concomitant disdain for fluency and language in general …

H contends that 'all language is already artificial, all speaking is unplain by design' (110). We can only find sincerity and spontaneity in 'prelinguistic cries, moans, and grunts' (115). 'There seems to be a yawning chasm between SYMPTOMS such as screaming with pain ... and SIGNS ... such as 'Ouch'...' (117).

Finally, H gives his theory of the origin of language: 'It is the transition from Zen semantics to correspondence semantics ... ' (129). For H, Zen semantics, or the attitude 'things are only what they are' is 'characteristic of a PRELINGUISTIC world in which there is as yet no bifurcation between the world and some language ABOUT the world ... ' (133). The origin of language began when 'the sound ... ceased to be just a sound and also became a phoneme: an interrupted sound invested with a meaning (by virtue of a code)' (133). H does not know when this happened but it occurred in the course of innumerable repetitions. Language evolves when the signs are repeated so often that they become decontextualized and are seen as an imitation of life—a fake.

A corresponding 'stylization through repetition is a characteristic of almost every CULTURAL institution': the stock market, the daily news, the use of money—all have become decontextualized from their basic purpose through ritualization (144-45). This need to ritualize is a universal. A surprising division occurs in the ritualization of grammar. Those categories which have become obligatory are often the ones which have no meaning. Examples of this arbitrariness are grammatical gender and number. This 'institutionalizing ... constitutes part of the very essence of our capacity for human language itself' (184).

The last idea returns to the beginning of this 'idiosyncratic' essay. Sarcasm, a repetition of words and phrases institutionalized in society and alienated from their plain meaning, is a good analogy for the way language evolved. H's examples and proofs, both cultural and linguistic, will amuse, instruct, and give the reader pause for thought.

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Negation and clausal structure: A comparative study of Romance languages. By RAFFAELLA ZANUTTINI. New York: Oxford University Press. 1997. 201 pp. Cloth $60.00.

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The syntax of negative constructions is among the most puzzling areas in human languages. Although one could logically expect parallel behavior in affirmative constructions and in their negative counterparts, the real picture is full of asymmetries. Zanuttini (Z) boldly seeks to give a linguistically motivated account of negative constructions in Romance languages, where the question is further complicated by the interaction of clitics with negation. The book provides both a typological classification of negative markers and a theoretical account within Government and Binding (GB) framework.

Z's typology is perhaps the most successful part of the study. She succeeds in classifying the manifold, seemingly idiosyncratic, collection of negative constructions in a small set of basic categories whose interaction captures most features of real-world cases.

A first dichotomy separates (A) negative markers in pre-verbal position from (B) negative markers in post-verbal position.[1] Within the former, a second dichotomy distinguishes (A1) markers which can negate a clause by themselves from (A2) markers which cannot, but rather need the co-occurrence of a B-type marker (like French *ne…pas*; pp. 8-10). Interestingly, even if the study is mainly at the synchronic level, Z links this three-way classification of negative markers to a so-called 'Jespersen's cycle', the general historical process first described by Jespersen (1917) according to which a negative marker which originally negated a sentence by itself (case A1) gradually weakened and needed a corroborative adverbial or nominal dummy complement (case A2) which eventually took on itself the main negative function, which led the original negative marker to disappear (case B). Jespersen's cycle is historically well attested in the Indo-European family; Z intimates that the synchronic situation which can be found in Romance varieties corresponds to different stages of this diachronic process (11-140).

In Ch. 2 (15-59), Z further refines her classification of pre-verbal negative markers (A) according to their position with regard to clitics. Z identifies two classes of subject clitics (vocalic [Voc] and agreement [Agr] clitics) and two classes of complement clitics: CL-1, which consists of first and second person pronominal clitics and reflexives, and CL-2, which consists of third person pronominal clitics, together with locative and partitive clitics. The order of clitics in strict: the standard sequence is: Voc Agr CL-1 CL-2. While negative markers which can negate a clause by themselves (A1) all occur between Voc and Agr, negative markers which cannot independently negate a clause (A2) are further divided into two subclasses: while all A2 markers follow subject clitics, some of them (A2a) precede all complement clitics, whereas some (A2b) stay between CL-1 and CL-2.

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[1] Symbols CL-l and CL-2 are employed by Z herself. Other symbols are my own; they are intended to make the typological classification clearer.

Post-verbal negative markers (B) are examined in Ch. 3 (60-104). Z again makes use of the position of other classes of words to determine the position of negative markers; in this case, the fixed reference points are a class of adverbs, so-called 'lower adverbs', whose relative position has been established by Cinque (1994, 1995, 1996). The adverbs relevant to the discussion can be grouped into three classes, each represented by a typical adverb: 'already', 'no more', and 'always'. These adverbs form two fixed positions to determine the position of the negation marker: Adv1 (typified by 'already') and Adv2 (typified by 'no more, always').

Z further identifies two distinctions within B: first, she separates presuppositional (B1) from non-presuppositional (B2) negative markers; the former precede all classes of adverbs, while the latter always surface after Adv1[2]. Second, she divides B2 into two subclasses: non-presuppositional negative markers which precede Adv2 (B2a) and those which follow all adverbs (B2b).

This clear-cut typology is of course somewhat idealized; Z herself admits some problematic cases. In some language varieties, negative markers which can negate a clause by themselves (A1) precede some, but not all agreement clitics (Agr); in such instances, third person agreement clitics typically precede A1 markers, while first person clitics follow them. Z solves this problem by positing two positions for agreement clitics and linking this synchronic situation to a diachronic development which leads clitics to shift from a higher position, close to the subject noun phrase, to a lower position, closer to the finite verb. Z does not state explicitly whether the higher position postulated for agreement clitics is identical to the position occupied by vocalic clitics.

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[2] Z offers the following definitions: '...a negative marker that negates a proposition without any particular discourse status (a "regular" or "non-presuppositional" negative marker) and one that negates a proposition that is assumed in the discourse (a "presuppositional" negative marker)' (76). See Cinque 1976.

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Other problematic cases come from presuppositional negative markers (B1) which occupy the position of non-presuppositional markers (B2), and vice versa; Z remarks that in these cases post-verbal markers are usually employed with the typical presuppositional value of the position they occupy: that is, it is the syntactic position which *determines presupposition* functions. This appears to be the case even in languages which have a unique post verbal marker for both presuppositional and non-presuppositional readings: the marker surfaces in position B1 or B2 according to the intended reading.

This way, Z's typology amounts to a sequence of slots occupied by a negation marker or a fixed reference point each:

Voc	vocalic subject clitics
A1	negative markers which can negate a clause by themselves
Agr	agreement subject clitics
A2a	pre-verbal negative markers which cannot negate a clause by themselves—1
CL-1	First and second person pronominal clitics, reflexives
A2b	pre-verbal negative markers which cannot negate a clause by themselves—2
CL-2	third person pronominal clitics, locative and partitive clitics
B1	post-verbal presuppositional negative markers
Adv1	already-type adverbs
B2a	post-verbal non-presuppositional negative markers—1
Adv2	no more—always type adverbs
B2b	post-verbal non-presuppositional negative markers—2

The strategy used by Z to convert the typology she devised into a theoretical account is simple enough: basically, she posits a syntactic representation in which every slot in the typology above corresponds to a functional projection. The direct translation of typology into structure is sometimes explicitly declared: for instance, when Z discusses the possibility of giving A1 and A2a a unique syntactic position, she states (23):

> I do not want to completely assimilate Italian *non* and French *ne*: I want to encode in the syntactic representation of these elements the fact that the former can by itself negate a clause while the latter cannot.

This strategy commits as little as possible to current theoretical assumptions, which in my opinion is an advantage rather than a flaw: given the pace of change in theoretical models within GB, rapid obsolescence of theoretical proposals is almost warranted, while good typological accounts remain. Z herself seems to be conscious of this state of affairs, since she declares (66):

> I will therefore adopt Cinque's proposal for the purposes of this work. To the extent that an alternative analysis provides answers to these problems, I suspect that my results will translate directly.

Cinque's (1995, 1996) proposal is one of the numerous extensions of Pollock's (1989) insight to split Infl[ection], the unique (at that time) functional projection which encoded all inflectional features of the main verb, into two more specialized functional projection, T[ense] and Agr[eement]. The tendency to further multiply functional projection has been one of the leading trends in recent GB work; it received a theoretical sanction by Kayne's (1994) theory of antisymmetry, which severely reduced possible phrase structure configuration—basically, to binary right branching head-complement configurations with at most two adjuncts/specifiers to the left—and explicitly required many, possibly abstract, functional heads to explain surface structures.

On the basis of the rigid relative order of seven classes of adverbs in Italian which surface between the inflected verb and the end of the clause (the lower adverbs), Cinque posits a sequence of six functional positions between these adverbs (the first row in the chart below). Z is mainly interested in the second to fourth functional positions (second row), which translate Adv1 and Adv2. Cinque separates 'no more' and 'always' type adverbs); she has every projection preceded and followed by a negation functional projection (101):

NegP-2	TP-2	NegP-3	$\text{AspP}_{\text{perf}}$	$\text{AspP}_{\text{gen/prog}}$	NegP-P4
B1	Adv1	B2a	Adv2		B2b

In the chart above, Z translates every typological slot into a functional projection. In Ch. 3, where the behavior of negative imperatives is discussed, the upper syntactic space is further articulated in several functional projections—NegP-1 stays between TP-1 and MoodP—again following Cinque's (1996) analysis.

The only exception to the immediate translation of typological slots into syntactic structures involves the two positions of markers which cannot negate a clause by themselves (A2): since they interact with complement clitics, which are treated, according to Kayne's (1994) analysis, as heads adjoined to functional projections, A2 markers are treated as generated in NegP-2 and adjoined again to the adjoined clitics by movement (Z discusses several possible analyses in pp. 23-26).

The sections where Z more directly deals with syntactic movement are in my opinion the least convincing parts of the book. In discussing pre-verbal negative markers and verb movement (44-58) Z correctly rejects as ad hoc current accounts of lack of verb movement in interrogative contexts in the presence of a negative marker. But she is forced to propose a no less ad hoc solution by positing different feature requirements for yes/no question operators and WH-constituents. This is done in order to account for yes/no question operators and WH-constituents, and to account for the impossibility of a WH-question with a non-clefted pre-verbal negation.

Another example of a debatable account can be found in the discussion of negative imperatives in Ch. 3 (105-154): Z is compelled to posit a null auxiliary which governs the suppletive imperative realized as an infinitive (like in Standard Italian) or a gerund (like in some Italian dialects) in order to explain the clitic-infinitive order which is optional in infinitives used as negative imperatives but is impossible in ordinary infinitives. The argument she cites to support this thesis is weak. According to Kayne (1992), in the Italian dialect spoken in Padua negative infinitives are realized as 'not + stay (imperative) + infinitive', so we can suppose an abstract auxiliary is always present in this type of construction.

Z chooses to present her analysis in the theory of GB. Like all choices of theory, this has implications for the analysis, both positive and negative. Work in other theories such as HPSG also has relevance to negation of this type (see Kim and Sag's 1995 study on French and English negation and Miller and Sag's 1997 article on French clitic movement 'without clitics or movement').

The treatment of data deserves some consideration. Studies within generative grammar are usually loose in collecting and treating dialectal data, since they structurally tend to minimize the extent of individual and collective variation. Under this respect, Z is far more accurate than current practice usually is: she always quotes the sources of secondhand data and makes every effort to reflect the complexity of real phenomena in her discussion. Even so, however, her standards remain very far from current requirements of dialectology (see Chambers and Trudgill 1980); in a footnote to Ch. 4, she declares that data presented in Chs. 1-3 are 'taken from a variety of sources, which include scholarly literature, work with informants, and questionnaires from ASIS (cf. Benincá et al, 1990-present)' [p. 175, fn. 19], but little effort is made to make precise the status of the informants. Whereas single informants, mostly linguists, are mentioned, in most cases only the dialectal area of the data is specified, without defining social status, sex, age and linguistic attitude of the speaker. This is very relevant for most Italian dialects, since in most cases Standard Italian or one of its regional koines is by now the first language of the speakers of dialects. This cannot fail to influence linguistic behavior, especially in syntax.

Orthography in the data is not always consistent. The writing of examples in substandard varieties is of course by definition not fixed, and consistency is a difficult task to reach especially when secondhand data are quoted, which does not always allow one to standardize orthography. There is however some lack of homogeneity in examples drawn from the same dialect, which could well be avoided. This is the case of the transcription of past participles in some northern Italian dialects. Z follows Italian orthographic conventions, which mark with an accent stressed final vowels in polysyllabic words; the stress, however, is lacking in many cases. Thus, we find in data from the same Italian dialect, *Pavese, 'l'è giamò parti'*, without accent (94), and *l'é mia partì*, with an accent next page (95). Another inconsistency can be seen in this couple, since *l'è* is written with two different accents. Clearly, such typos can be partially explained by the difficulty of composing texts in substandard varieties, but more attention to proofreading would have been useful to avoid the somewhat haphazard data in substandard varieties.

A final remark concerns Z's hypothesis on negative imperatives (149): 'Whereas we know of overt verbal forms that take an infinitival complement, we are not aware of auxiliary or modal verbs that can be followed by a form of the indicative.' Such a case does indeed exist. In Standard Arabic the auxiliary verb *kāna* 'to be' can be followed by the indicative of a verb to express duration in the past: *kuntu aktubu*, lit. 'I was I write', meaning 'I used to write'. Similar constructions are possible with a variety of modal verbs.

Despite these final remarks on shortcomings, in general I consider this book to be a most interesting work. It can be recommended to anyone interested in Romance dialectology, and to general linguists concerned with the syntax of negation.

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Linguistics: an introduction. By Donna Jo Napoli. 1996. New York: Oxford University Press. 580 pp. Paper $29.95.

Reviewed by Steve Marlett
SIL—Mexico Branch and University of North Dakota

This is an introductory linguistics textbook filled with meat. Don't look for a chapter on how bees signal where the pollen is. No, this is CORE linguistics in the most traditional sense. Five packed chapters fill the 550-plus pages—Phonetics, Phonology, Morphology, Syntax, and Semantics.

Napoli (N) is an excellent linguist and, one would surmise, a talented professor. The book draws from her experience teaching this course and others at Swarthmore College. The substantial exercises that accompany each chapter are perhaps in themselves worth the cost of the book. The style is informal, sometimes chatty, but it would be a wrong to mistake that for a lack of seriousness.

The chapter on phonetics (66 pages) contains much of what one would expect, including features and a bit of acoustic phonetics, plus a bonus in that American Sign Language is the topic of one of the exercises at the end of the chapter. Very early on, however, N informally introduces the notion of the phoneme. I found the following statement unfortunate:

> The simplest way to recognize whether two sounds are separate phonemes or allophones of a single phoneme is to look for minimal pairs. If you are lucky

> enough to find a minimal pair, the two sounds in question are separate phonemes.

Unfortunately, this oversimplification is never corrected. (Minimal pairs tell us that SOMETHING distinguishes the two words, but that is all. The words [pa] and [pã] are minimal pairs, but the correct analysis might be /pa/ and /pan/, for example.)

Phonology (94 pages) picks up on the notion of phoneme introduced earlier, but quickly gets to phonological processes and rules—first linear generative style, then autosegmental style with feature geometry, metrical phonology (trees and grids), Lexical Phonology, and Optimality Theory. Whew! And exercises that deal with most of these topics (the first one is based on American Sign Language). This may be the most ambitious chapter of the book, considering that amount of material N is trying to cover in such little space.

There were a number of areas in this chapter where I had questions or difficulties or objections of various types. One doesn't find references to sources of data in the chapter itself, however, so it is difficult to track something down. (At the end of the book, some general references are given for each chapter, but these do not relate specifically to data.) I noticed that Seri (a language I happen to have studied and published on) was used to illustrate compensatory lengthening. Unfortunately, the rules referred to have nothing to do with compensatory lengthening at all. I may be the only person that would know that, but it did leave me wondering about other facts that I couldn't check up on. The lesson is, I think, that we should all be more careful in citing sources.

Morphology gets about 122 pages, and is heavily oriented toward English. That's fine, I think, because N is able to lead the reader through a very wide variety of descriptive and theoretical issues, including lexical vs. derivational morphemes, Unitary Base Hypothesis, productivity, language typology, inflectional vs. derivational affixes, prosodic morphology, reduplication, infixes, process morphology, compounding, bracketing paradoxes, case systems, and clitics. American Sign Language again appears in the exercises at the end of the chapter.

Syntax takes up 160 pages, quite a bit more than Semantics (with just over 100). The orientation is fairly recent generative theory. Like the other chapters, it provides a quick overview of many topics that are important to anyone (tests for constituency, for example), or important to someone trying to develop an appreciation for work being done within this paradigm (functional heads, Agr, Exceptional Case Marking, Null Subject Parameter, PRO, Subjacency, Strict Cyclicity, Theta Theory and even a bit on

Minimalism). As I said, the orientation seems to be towards theory. Don't expect to find a discussion of typology here, or even a quick side-glance to other competing theories of syntax.

The chapter on semantics deals with some basic topics, but it gives traditional formal semantics a greater amount of space than one would think appropriate—given all of the far more interesting work (in my opinion) being done that approaches semantics quite differently.

I doubt that I would use this book to teach an introduction to linguistics course. The emphasis is a bit too formal and is not sufficiently oriented towards languages other than English. But I do appreciate the great amount of work that N has put into it because it has helped me understand and appreciate some lines of research that I have not followed closely. This book is worth reading and rereading, both by serious linguistics students and field linguists who want to keep stretching.

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Functional English grammar: An introduction for second language teachers. By GRAHAM LOCK. Cambridge Language Education.

New York: Cambridge University Press. 1996. 297 pp.
Hardback $44.95, paper $17.95.

Reviewed by RONNIE J. SIM
SIL—Africa Group

This book is about the grammar of English, and the thirteen chapters cover the range of basic topics that might be expected, but it rightly claims for itself an introductory role, and is not as complete as a reference grammar. Building on the approach of Halliday, Lock (L) provides a very practical introduction to a functional understanding of English grammar. It is intended to be used by second language teachers and trainee teachers of English. It is a textbook, pedagogically oriented for its intended readership, but it is neither a pedagogy for the English language learner nor a technical linguistic discussion. Advanced learners will profit by it, but others will require an instructor's input.

The book's focus makes it an easy way into central concepts of functional grammar for the linguist who is not theoretically focused, via their application to a familiar language. The reader coming from a background of formal models of syntax can expect to find the conflation of semantic functions with syntactic structures: one of the starting axioms of functional models. It is the kind of book that the very practically-minded field linguist might include in a list of titles for a reading week designed to catch-up on reading.

It is also a useful grammar for translators working out of English, whose first task is a conscious interpretive control of an English source text. (Informally) trained translators have possibly paid too little attention to structure-functional aspects of the source text, especially those whose first language is not English. Although functional grammar combines semantics and syntax in ways that not every linguist will agree with, this model can marry with other approaches to semantics, and focuses attention on interpretive values of structure rather than only formal or theoretical interests. This is exactly the kind of approach to a source text that a translator needs. There are occasional cross-language comments of a typological nature (see pp. 76f, 89, 134, 163 for example) although these are unfortunately not referenced in the index, and they are too few and unsystematic to be of significant value.

Ch. 1 covers Nouns and introduces the distinctions of count, mass and collective nouns. Ch. 2 looks at noun groups (phrases), and spends time on the topic of referrers (more familiarly covered under referring expressions), qualifiers, quantifiers and post-head qualifiers, this last treating relative clauses. Nominalised processes and qualities are also introduced.

Chs. 3 through 6 are devoted to the verb group. Its structure in terms of auxiliaries, modals, semi-modals and lexical verbs is discussed briefly, then semantic frames and roles. Actions, processes and ergativity, and verb-particle constructions are introduced, and 'Phrase' which covers various aspect-like distinctions such as start-continue-finish, try-manage-avoid, and hesitate-tend-help qualifications on the action process, and causatives.

Chs. 7 through 10 deal with a number of other functional concepts: mental and verbal processes (7), ontological and existential processes (8), speech acts and mood, or sentence type (9), and modal auxiliaries and modality, including conditionals (10).

Ch. 11, on organising messages coherently, deals with the broad issues of theme (marked vs unmarked word order, theme-rheme) and focus (given-new information, intonation groups, voice and clefting). Ch. 12 discusses combining messages in complex sentences dependent/independent clauses, linking and binding (or coordination and subordination), logical relationships between clauses (some familiar, some more idiosyncratic).

Ch. 13, the final one, is an apologetic for the value of (the right kind of) grammar in second language learning, against the background of disfavour to which traditional use of grammar in language learning has (rightly) been treated in recent decades. Some discussion is given to the question of method, which, while disdaining a panacea, unsurprisingly comes down in favour of functional approaches to 'grammar [as] a resource for making and exchanging meaning in context' (276). Grammar must be integrated into the teaching of speaking, listening, reading and writing skills, and used to engage the learner 'in meaningful and motivating activities' (277).

All content chapters include one or more sections with short discussions of the learning and teaching difficulties of the various communicative strategies which are covered, and these are useful for the teacher. Each chapter provides a number of exercises ('tasks') for which brief answers are provided at the end of the chapter. Discussion questions are also presented without feedback. Each chapter concludes with a numbered list of points summarising the chapter, and a list of key terms introduced, with a brief gloss which frequently relates the term to its best equivalent in other approaches. Perhaps the only eccentricity is the use of 'group' instead of the more familiar 'phrase.' As constituents, PP and S are exocentric, in that none of the element words of which they are composed is functionally equivalent to the whole constituent; PP → P + NP and S → NP + VP, for example. This contrasts with endocentric constituents, such as NP. While the distinction of group (exocentric constituents) from phrase (endocentric constituents) is valid to Hallidayan eyes, it is arguable whether there is any pedagogical value in distinguishing the two terminologically in this way; most syntactic theories do not think so.

This is a book that second language teachers of English will find to be a helpful resource; descriptive (field) linguists who are interested in broadening their knowledge of functional grammar or how it is applied to a familiar language, and second language speakers of English who translate English source texts will also find L rewarding.

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■

Book Notice

Particles: On the syntax of verb-particle, triadic, and causative constructions. By MARCEL DEN DIKKEN. 1995. New York: Oxford University Press. 300 pp. Cloth $46.00, paperback $24.95.

Den Dikken approaches the problems of the verb-plus-particles constructions in English, Dutch and other Germanic languages using the Government-and-Binding model.... He also pursues the notion of 'small clauses' .... This is not a textbook nor an introductory book for new students. Instead, it should primarily be of interest only to people who are well versed in Chomsky's recent theories, or those working on particles in some other theory.

[Reviewed by Charles Peck *(SIL-Int'l Administration Waxhaw)* Box 248, Waxhaw, NC 28173]

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In this expansion of work by John Daly, Larry Lyman, and Mary Rhodes, Albert Bickford shares his enthusiasm for languages and linguistics with the reader by presenting a practical guide for acquiring skills necessary to analyze the morphology and syntax of languages around the world. Written in an informal, personal style, this is a practical book for teacher and student alike, a rich storehouse of references and helps in addition to the theoretical content drawn broadly from work within generative grammar. Most chapters begin with a statement of goals and a list of prerequisites for understanding the information contained in them. Examples and explanatory diagrams are distributed liberally throughout the text. The review of key terms, questions for analysis, and sample descriptions which appear at the end of most chapters help the student to apply the theoretical material. References for further reading are provided for those wishing to study further. Dr. Bickford serves in Tucson, Arizona, as a linguistic consultant with SIL, teaching and advising language workers who are investigating the languages of Mexico. Most summers he teaches the course from which this book developed at the SIL, University of North Dakota, and directs the University's graduate program in linguistics.

Pb. ISBN: 1-55671-047-x; x+400 pp., 1998. $39.00.

LOGICAL RELATIONS IN DISCOURSE. Loos, Eugene E. editor;

When a workshop on logical connectives was first suggested, a leading linguist asked, "Are they really logical?" Logical relations between propositions were an elusive subject about which little research was available prior to that workshop held in 1989. Field method guides offered nothing for the analysis of signals that tell how a speaker intends for the listener to interpret and associate the propositions in a discourse. The articles in this volume discuss the indicators used by speakers and hearers in a wide range of languages to connect parts of discourse. The cues are sometimes related explicitly to lexical or syntactic features of the discourse; they are often linked to pragmatic aspects, the intended illocutionary effect, and at other times to the knowledge of the participants in the discourse. The goal of the authors is to assist the reader in reaching an understanding of how to determine what the speaker intends, how to identify the cues for the listener, and how to employ those cues.

Pb. ISBN: 1-55671-040-2; xviii+259 pp., 1999, $29.00

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FROM THE LINGUISTICS DEPARTMENT

Velma Pickett retiring as International Consultant

Velma Pickett is retiring from service as an International Linguistics Consultant to SIL, after many years of valued contribution. Ben Elson, who worked closely with Velma for many years, has kindly written the comments below, in appreciation of her.

—David Payne
Editor

Tribute to Velma Pickett

Velma Pickett was born in Nebraska and grew up in the little town of Mallin where her father was a teacher and then head of the Post Office. She went from kindergarten through high school there. It was a small town, there were 100 kids in the high school. After she graduated her parents moved to California where she began her college education. She first studied at Long Beach Junior College and then transferred to UCLA majoring in English Literature. Some of her fellow students were Evelyn Griset (Pike), Florence Hansen (Cowan), Otis Leal, Mary Carter (Leal), Eugene Nida, and Ethel Wallis—some of the early mainstays of SIL. While at UCLA, Velma worked on the school newspaper, *The Daily Bruin*.

After graduation she spent four years working with University Bible Clubs in Los Angeles. She then decided to attend the Bible Institute of Los Angeles and as she says, 'I managed to cram the three year course into four years', graduating in 1943. Among other activities she was Assistant Editor of the Biola newspaper, the *Biola Chimes*.

In 1942 she attended the SIL courses at the University of Oklahoma, then returned to Biola for her final year. In 1943 she attended the first 'second year' course set at SIL, which because of the war had moved from OU to Bacone College in Muskogee, OK. Following that course she went to Mexico, where she was assigned with Marjorie McMillan (Nyman) to work with the Isthmus Zapotec.

In 1944 Gene Nida invited her back to SIL to edit the *Wycliffe Chronicle*, the publicity piece that came out each summer for students to show friends where they had been during the summer. Since one of Nida's assistants had to leave during the summer, he asked Velma to teach that section of beginning grammar. As a result she became a permanent member of the OU SIL summer staff.

In 1950-1951 she attended Cornell Graduate School and received her MA, and in 1956-1959 attended the University of Michigan and received her PhD. In the mid-50s Eugene Nida resigned from SIL and Velma was given the responsibility for teaching beginning grammar. She wrote a grammar textbook. Later she and I collaborated on a textbook for the course.

During these years Velma and her partners also concentrated on work in Isthmus Zapotec, work which included a Zapotec-Spanish dictionary and a translation of the New Testament

Her important contributions to SIL have been not only her work on Isthmus Zapotec and teaching at the summer SIL programs, but also that of teaching linguistics in various Latin American countries: Mexico, Ecuador, Chile, Argentina and Puerto Rico.

In 1991 Velma served as President of the Linguistic Association of Canada and the United States (LACUS). She has had a long and distinguished career in SIL.

—Ben Elson
SIL—Mexico Branch

Linguistics Consultants Workshop

During August 1999, the International Linguistics Department sponsored a workshop for training and updating current and prospective Linguistics Consultants from different SIL entities and affiliated organizations around the world. There were 27 participants. Among the various activities were updating lectures in different areas of linguistics: Discourse (Stephen Levinsohn and Lou Hohulin), Semantics (Les Bruce), Morphosyntax (Don Burquest) and Phonology—Optimality Theory (Mike Cahill).

Mike

—Michael Cahill
International Linguistics Coordinator

Multidimensional exploration of online linguistic field data

Steven Bird
University of Pennsylvania

1. **Abstract.** Advances in storage technology make it possible to house virtually unlimited quantities of recorded speech data online. Advances in character-encoding technology make it possible to create platform-independent transcriptions. Advances in web technology make it possible to publish this data for essentially no marginal cost. These developments have profound consequences for the accessibility, quality and quantity of linguistic field data. Recordings become accessible. Transcriptions become verifiable. Large corpora become manageable. In order to illustrate the potential for this mode of operation in field linguistics, I describe a piece of online fieldwork involving a tone language of Cameroon. A complex verb paradigm for Bamileke Dschang has been collected and transcribed, and audio and laryngograph recordings have been digitised and segmented. A central insight of Hyman's analysis concerning the domain of tone rules has been applied to the new data. A program for multidimensional exploration of the data has been developed, and can be accessed through a web version of this paper. The web page also contains digitised speech recordings of all the data items presented here. These three lines of inquiry—primary description, theoretical analysis, and tool development—are synthesised, resulting in a new methodology for the investigation of linguistic field data.

2. **Fieldwork as a computational problem.** Linguistic fieldwork deals with essentially three kinds of data: lexicons, paradigms and texts. A lexicon is a database of words, minimally containing part of speech information and glosses. A paradigm (broadly construed) is any kind of rational tabulation of words or phrases to illustrate contrasts and systematic variation. Just about every data display in the *Handbook of Phonological Theory* (Goldsmith 1995) counts as a paradigm under this definition. A text is essentially any larger unit such as a narrative or a conversation. In addition to these three kinds of data, linguistic fieldwork deals with three main kinds of meta-data: field notes, descriptive reports and analytical papers.

These various kinds of data and meta-data enter into a complex web of relations. For example, the discovery of a new word in a text may require an update to the lexicon and the construction of a new paradigm (e.g. to correctly classify the word). Such updates may occasion the creation of some field notes, the extension of a descriptive report and possibly even the revision of the manuscript for an analytical paper. Progress on description and analysis gives fresh insights about how to organise existing data and it informs the quest for new data. Whether one is sorting data, or generating helpful tabulations, or gathering statistics, or searching for a (counter-)example, or verifying the transcriptions used in a manuscript, the principal challenge is computational.

Assuming that one could successfully address these issues, there are some obvious implications for theoretical linguistics. For example, the language index of the *Handbook of Phonological Theory* lists over 400 languages whose data informs contemporary theoretical investigations. The predominant distribution method for this data is print-based, relying on specialist journals and on descriptive works which are typically not in the form of archival publications.[1] Once the field data is available online, research papers can link directly to the recordings and transcriptions it contains. Readers can hear the examples, open a waveform viewer on the digitised speech, rerun the statistics, repeat database queries, issue different queries to see how well the reported findings generalise, and so on. In this way, each research paper provides a new springboard back into the data. Of course, these developments afford no protection against asking the wrong questions or failing to collect the right data.

This paper applies computational methods to field phonology. Surveys of computational approaches to other areas of phonology can be found in Bird 1994b, 1995, and by visiting the homepage of the ACL Special Interest Group in Computational Phonology at [`www.cogsci.ed.ac.uk /sigphon`].

In the next section I introduce tone languages in general, and Bamileke Dschang in particular. Next, in §4 I describe the construction of tone paradigms and how they can be represented online. Section 5 is a more detailed treatment of downstep in Dschang, along with a discussion of double downstep. A web page accompanies this paper, and is designed to be browsed alongside the paper version. The page reproduces all of the numbered linguistic examples and data tabulations of this paper. Each data item is a hyperlink to a speech recording. The tabulations have hyperlinks to queries which produce similar tabulations dynamically. A form-based interface permits users to modify the queries and conduct their own exploration of the data, accessing thousands of speech clips, pitch traces and tone transcriptions. The page can be reached at [`www.ldc.upenn.edu/sb/fieldwork/`].

---

[1] Phonology is better off in this regard than some other linguistic domains. For example, the *Handbook of Contemporary Semantic Theory* (Lappin 1996) has no need for a language index since it only considers English, a stark illustration of the inaccessibility of field data.

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3. An empirical challenge: tone in Bamileke Dschang. Almost 2000 languages are spoken in sub-Saharan Africa (Grimes 1996). The Niger-Congo language family is the largest and by far the most important group as far as tone is concerned. This family stretches from Senegal in the west to Kenya in the east and down into South Africa, and includes the important Bantu language family. Comprehensive surveys of Niger-Congo are available: Welmers 1973; Bendor-Samuel 1989; and of tone in general: Fromkin 1978; Clements and Goldsmith 1984; van der Hulst and Snider 1993; Odden 1995. Phonetic investigations of African tone languages include: Connell and Ladd 1990; Inkelas and Leben 1990; Laniran 1992; Liberman et al. 1993; Herman 1996; Snider 1998.

The vast majority of the Niger-Congo languages are TONAL, i.e. voice pitch on an individual syllable may carry contrastive meaning, either lexical or grammatical. One such language is Dschang [ʧɑŋ] (known to its speakers as [jɛ́mbɑ̀], lit. 'I say!'). Dschang is spoken in the Ménoua region of the Western Province of Cameroon, itself situated in the continental 'hinge' between western and southern Africa. Dschang is classified as a Grassfields Bantu tone language (Watters and Leroy 1989). Grassfields languages manifest predominantly SVO word order and little morphology apart from a noun-class system which is simplified relative to the rest of the Bantu group (Hyman et al. 1970). The segmental phonology of Dschang has been described in detail by Haynes (1989) and Bird (1999a). A dictionary has been compiled (Bird and Tadadjeu 1997), and a short history of the development of the language has been written (Momo 1997). The phonetics of tone in Dschang is addressed by Bird (1994a), Bird and Stegen (1995) and Connell and Bird (1997). The second of these involved recordings of Maurice Tadadjeu, the original speaker on which all the data was based. The recordings are available on the web.

Dschang is noted for its rich system of terracing downstep (or progressive tonal lowering). Some unusual tone sequences H↓H, H↓L, L↓H and L↓L are attested (where ↓=downstep, H=high, L=low) and these enter into complex alternations. Dschang also manifests double downstep between high tones (H↓↓H). Dschang lacks so-called 'automatic downstep'—H lowering due to a preceding linked L. Some of the tonal alternations have been the subject of several published studies: Clark 1993; Hyman 1985; Hyman 1993; Hyman and Tadadjeu 1976; Pulleyblank 1986; Anderson 1980; Stewart 1981; Stewart 1993; Tadadjeu 1974. This paper presents a large body of new data, transcribed from laryngographic recordings of Dschang speakers in Cameroon. In marked contrast to the existing studies which have focussed on the associative construction, this study focuses on the verb phrase. The Dschang verb phrase is interesting for reasons other than tone (Hyman 1980).

Example (1) demonstrates the use of tone to distinguish lexical meaning. All the forms are morphologically marked as nouns (viz. the class 5 *lə̀-* prefix). Tadadjeu (1974:284) was the first to report this data, and the roots (i.e. the second syllables) have been tonally classified according to the scheme laid out by Hyman (1985:48).

(1) a. H lə̀tɔ̌ŋ [-´] 'feather'
b. HL lə̀tꜜɔ́ŋ [-¯] 'reading'
c. LH lə̀tɔ̀ŋ° [--] 'navel'
d. L lə̀tɔ̀ŋ [-\] 'finishing'

Note that, following standard practice, acute accent (ə́) indicates high tone and grave accent (ə̀) indicates low tone. These diacritics are combined to create rising (ə̌) and falling (ə̂) tone. Phrase-final low tones are falling, except when transcribed with a following degree sign. In the northern (Bafou) dialect of Dschang (which has been the focus of most of the research on the language) a phrase-final H tone, when preceded by L, is realised as a rising tone. This accounts for the form we see in (1a). All data items in this paper are accompanied by line diagrams, i.e. 'pitch transcriptions', to avoid the ambiguities of interpretation that occur when only tone-marked segmental transcriptions are given.

Example (2) illustrates the use of tone to convey grammatical contrasts. The three examples use the same lexical items: *ə̀fɔ̀* 'chief', *kə̀mtè* 'bury', *mə̀mbhꜜʉ́* 'dogs'. The vowels in isolation are concord markers that will be discussed later. Underlining is used to indicate where the past and future tense forms differ from the present tense form. (Note that the pitch transcriptions for phrases include vertical bars; these indicate word domain boundaries, and will be explained in §5.3.)

(2) a. ə̀fɔ̀ ɔ̲́ ꜜkə̀mtè ꜜmə́mbhʉ́ [-|-¯|--‑|-] 'the chief buried dogs' '(immediate past)'
b. ə̀fɔ̀ ɔ̀ kə̀mtè mə̀mbhꜜʉ́ [-|--|---|¯] 'the chief buries dogs' '(simple present)'
c. ə̀fɔ̀ ɔ̀ ꜜk̲ə̀mtè ꜜmə́mbhʉ́ [-|--|--|--] 'the chief will bury dogs' '(immediate future)'

The value of using a two-way tone contrast H/L along with what we now know as floating tones was recognised by Voorhoeve (1971) and exploited extensively by Hyman and Tadadjeu (1976) and most subsequent work on the language group.

The mere existence of lexical and grammatical tone might not be particularly interesting if it were not for the fact that Dschang manifests some particularly intriguing tonal alternations. Example (3) illustrates the alternations that *mə̀mbhꜜʉ́* 'dogs' enters into.[2]

(3) a. L↓H əfɔ̀ ɔ̀ mə̀mbhꜜʉ́ [-|--|⁻] 'chief of dogs'
b. ↓HH əfɔ̀ ɔ̀ ꜜkèmtè ꜜmə́mbhʉ́ [-|--|--|-] 'the chief will bury dogs'
c. H↓H əfɔ̀ ꜜɔ́ kápté mə́mbhꜜʉ́ [-|-⁻|⁻⁻⁻|-] 'the chief will cover dogs'
d. H↓L əfɔ̀ ꜜɔ́ kápté mə́mbhꜜʉ̀ [-|-⁻|⁻⁻⁻|_] 'will the chief cover dogs?'

4. Constructing tone paradigms and putting them online.

4.1. Selection of nouns. We have already seen the four possible tone melodies of nouns in (1). Linking a noun with following material requires a vocalic concord marker (CM). The tone borne by this marker is L for nouns in classes 1 and 9, and H otherwise (Hyman 1985: 49). This two-way choice leads to eight possibilities for the subject noun, as listed in Table 4. The subject nouns were required to be human so they could legitimately function as agents in the sentence constructions. Minimal pairs were avoided since it was found that these are too easily confused in elicitation sessions involving complex paradigms.

(4)	a.	H+L	ǹdɔ̌ŋ	[-⁄]	'lazy man'
	b.	HL+L	m̀bꜜúŋ	[-⁻]	'poor man'
	c.	LH+L	fòk˚	[-]	'cowife'
	d.	L+L	əfɔ̀	[-\]	'chief'
	e.	H+H	mə̀lɔ̌ŋ	[-⁄]	'lazy men'
	f.	HL+H	mə̀pꜜúŋ	[-⁻]	'poor men'
	g.	LH+H	mə̀fòk˚	[--]	'cowives'
	h.	L+H	mə̀fɔ̀	[-\]	'chiefs'

For the object nouns I have retained Hyman's set. This controls for the lexical tone of the noun, and the presence or absence of a low tone prefix. (Note that the tone of *sə́ŋ* and *ꜜmɔ́* are indistinguishable in isolation.)

---

[2] Needless to say, this state of affairs poses some interesting challenges for orthography. A reading experiment has demonstrated that a phonemic orthography for the tone system is unworkable (Bird 1999d).

(5)	a.	L+H	mə̀tsɔ̌ŋ	[-ˊ]	'thieves'
	b.	L+HL	mə̀mbhꜜʉ́	[-¯]	'dogs'
	c.	L+LH	mə̀ŋkʉ̀ɔ̀ʔ°	[--]	'roosters'
	d.	L+L	mə̀nzwì	[-ˎ]	'leopards'
	e.	H	sɔ́ŋ	[¯]	'bird'
	f.	HL	ꜜmɔ́	[¯]	'child'
	g.	LH	kɑ̀ŋ°	[-]	'squirrel'
	h.	L	nɑ̀	[ˎ]	'animal'

For the associative (or genitive) construction, one juxtaposes these two sets of nouns in all possible ways to get 64 combinations: noun$_1$-CM-noun$_2$. However, here we shall employ the nouns in the construction of verb paradigms.

4.2. Verb paradigms. In constructing verb paradigms some additional steps were necessary. Unlike nouns, verbs exhibit a two-way tone contrast between H and L. Verbs may be mono- or bisyllabic, but the second syllable (a CV verbal extension) is never contrastive for tone. Simplifying somewhat, in forming an SVO phrase two concord markers and one or more tense-aspect markers (TAM) are required: subject-CM$_1$-TAM-verb-CM$_2$-object. This looks rather like two copies of the associative construction, and yet in this construction we can observe tone sequences like H↓L and H↓↓H which are not attested in the associative construction. The same can be said for certain longer sequences. For example, the L↓HL sequence does not appear in the associative construction and Hyman (1985: 62) has a rule converting it to L↓LL. However, in the verb paradigm we find L↓HL on low toned verbs in the immediate past conditional when followed by a prefixed noun. For example: *ə̀fɔ̀ ɔ̀ kə̀mtꜜé mə̀mbhꜜʉ́* [-|--|-¯_|-] 'if the chief just buried dogs'. These new possibilities provide a useful testbed for evaluating existing analyses of the tone system.

The tone of CM$_1$ depends on the class of the subject noun, as before. The tense-aspect marker contributes tonal material, and sometimes segmental material as well. The tone contributed by CM$_2$ depends on the tense-aspect. Table 1 illustrates the situation, fixing the subject and object nouns, inserting two verbs, and running through nine traditionally recognised 'tenses'.[3]

Note that the transcriptions reported in Table 1 are being continually updated as part of the online fieldwork. Please refer to the online transcriptions rather than

---

[3] The tense labels, following (Hyman 1980), are P5=remote past, P3=yesterday past, P2=today past, P1=immediate past, PR=present, PP=present progressive, F1=immediate future, F4=after tomorrow future, F5=remote future. The following pairs of tenses appear to be tonally identical and so have been represented by one member: P4=P3, F2=F5, F3=F4.

	High tone verb: kɑpte *cover*		**Low tone verb: kəmte** ***bury***	
P5	ə̀fɔ̀ ɔ̀ lèlá? ŋ́k↓ɑ́pté máts↓ɔ́ŋ	[-|---|¯¯|¯--|-]	ə̀fɔ̀ ɔ̀ lèlá? ŋ́kə̀mtè ↓mə́tsɔ́ŋ	[-|---|¯¯|--¯|¯]
P3	ə̀fɔ̀ ɔ̀ kè kɑ́pté mə̀tsɔ̌ŋ	[-|---|¯¯-|/]	ə̀fɔ̀ ɔ̀ kè ↓kə́mté mə̀tsɔ̌ŋ	[-|---|¯¯_|/]
P2	ə̀fɔ̀ ɔ́ ŋ̀k↓ɑ́pté máts↓ɔ́ŋ	[-|-¯-|¯--|-]	ə̀fɔ̀ ɔ́ ↓↓ŋ́kə́mté máts↓ɔ́ŋ	[-|-¯-|---|_]
P1	ə̀fɔ̀ ɔ́ ↓↓kɑ́pté máts↓ɔ́ŋ	[-|-¯|---|_]	ə̀fɔ̀ ɔ́ ↓kə̀mtè ↓mə́tsɔ́ŋ	[-|-¯|__-|-]
PR	ə̀fɔ̀ ɔ̀ ↓kɑ̀ptè mə̀tsɔ̌ŋ	[-|--|---|/]	ə̀fɔ̀ ɔ̀ kə̀mtè mə̀tsɔ̌ŋ	[-|--|---|/]
PP	ə̀fɔ̀ ɔ́ ↓↓sé ŋ́kɑ́pté máts↓ɔ́ŋ	[-|-¯|--|---|_]	ə̀fɔ̀ ɔ́ ↓↓sé ŋ́k↓ə́mté máts↓ɔ́ŋ	[-|-¯|--|---|_]
F1	ə̀fɔ̀ ↓ɔ́ kɑ́pté máts↓ɔ́ŋ	[-|-¯|¯--|-]	ə̀fɔ̀ ɔ̀ ↓kə̀mtè ↓mə́tsɔ́ŋ	[-|--|__-|-]
F4	ə̀fɔ̀ ɔ̀ ↓lù↓ú kɑ́pté máts↓ɔ́ŋ	[-|--|_-|---|_]	ə̀fɔ̀ ɔ̀ ↓lùù ↓kə̀mtè ↓mə́tsɔ́ŋ	[-|--|--|__-|-]
F5	ə̀fɔ̀ ↓ɔ́ fú ↓kɑ́pté máts↓ɔ́ŋ	[-|-¯¯|---|_]	ə̀fɔ̀ ↓ɔ́ fú kə̀mtè ↓mə́tsɔ́ŋ	[-|-¯¯|__-|-]

Table 1: A tense-based slice through the paradigm, for indicative mood

this snapshot for updates. Note also that there is a degree of arbitrariness about ↓↓ placement in Table 1. If we have a sequence [¯--] and there is independent evidence that the initial and final pitches both correspond to H, then we could have H↓↓HH or HL↓↓H, an indeterminacy which can only be resolved by analysis. Bird 1994a documents other transcriptional indeterminacies in the context of the parametric system of tone interpretation proposed by Liberman et al. 1993. The pitch transcriptions are immune to this indeterminacy problem.

Fortunately, it is not necessary to repeat the above process with each of the 64 noun pairs. The addition of the verb permits a simplification of the tonal paradigm. We can fix the object noun and elicit all combinations of the eight subject nouns and the two verbs (i.e. 16 sentences), then fix the subject noun and elicit all combinations of the two verbs with the eight object nouns (i.e. another 16 sentences). Discarding the two sentences that are duplicated in this process, we have a total of 30 sentences to elicit for each tense-aspect. Table 2 illustrates part of this process for the H verb.[4]

These 30 items were then elicited for the nine tenses listed in Table 1, to create a paradigm of 270 items. This process was repeated for five mood/voice possibilities: indicative, negative, interrogative, conditional and focus, each adding interesting new tonal information to the sentences. The full dataset of 1350 items was digitally recorded for three speakers (with audio and laryngograph channels) and then uploaded and segmented to create 8100 speech clips.

4.3. Paradigm tool. A flexible tool has been developed for navigating the data along any of its dimensions, constructing tabulations of interesting slices through the hypercube of data, viewing pitch traces, and listening to digitised

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[4] The *e*∼*ɛ* alternation in the verb in the left column of Table 2 is addressed in §5.3.

	Varying object nouns		**Varying subject nouns**	
L	ə̀fɔ̀ ꜜɔ́ kápté mə́nzwì ꜜì	[-|-¯|¯¯¯|-_]	ə̀fɔ̀ ꜜɔ́ kápté mə́tsꜜɔ̄ŋ ŋ̀	[-|-¯|¯¯¯|╲_]
LH	ə̀fɔ̀ ꜜɔ́ kápté mə́ŋkꜜùɔ̀? ì	[-|-¯|¯¯¯|__]	fòk ꜜó kápté mə́tsꜜɔ̄ŋ ŋ̀	[-¯|¯¯¯|╲_]
HL	ə̀fɔ̀ ꜜɔ́ kápté mə́mbhꜜù ù	[-|-¯|¯¯¯|__]	m̀bꜜùŋ ꜜɔ́ kápté mə́tsꜜɔ̄ŋ ŋ̀	[-|-¯|¯¯¯|╲_]
H	ə̀fɔ̀ ꜜɔ́ kápté mə́tsꜜɔ̄ŋ ŋ̀	[-|-¯|¯¯¯|╲_]	ǹdꜜɔ́ŋ ɔ́ kápté mə́tsꜜɔ̄ŋ ŋ̀	[-|¯¯|¯¯¯|╲_]
L	ə̀fɔ̀ ꜜɔ́ káptɛ́ nà ꜜà	[-|-¯|¯¯-|_]	mə̀fɔ̀ ɔ́ ꜜkápté mə́tsꜜɔ̄ŋ ŋ̀	[-|-¯|¯¯¯|╲_]
LH	ə̀fɔ̀ ꜜɔ́ káptɛ́ kàŋ ꜜŋ̀	[-|-¯|¯¯-|_]	mə̀fꜜók ꜜkápté mə́tsꜜɔ̄ŋ ŋ̀	[-|¯|---|╲_]
HL	ə̀fɔ̀ ꜜɔ́ káptɛ́ ꜜmɔ̀ ɔ̀	[-|-¯|¯¯|__]	mə̀pꜜúŋ ŋ́ ꜜkápté mə́tsꜜɔ̄ŋ ŋ̀	[-|¯¯|---|╲_]
H	ə̀fɔ̀ ꜜɔ́ káptɛ́ sɔ̄ŋ ꜜŋ̀	[-|-¯|¯¯|╲_]	mə̀lɔ́ŋ ŋ́ ꜜkápté mə́tsꜜɔ̄ŋ ŋ̀	[-|¯¯|¯¯¯|╲_]

Table 2: A noun-based slice through the paradigm, for F1 interrogative

speech data. The tool is written in Perl (Wall et al. 1996) and operates as a 'Common Gateway Interface' program on the web, providing users with a familiar forms-based interface. Its design is based on *HyperLex* (Bird 1997), with influences from the SIL programs Shoebox (Buseman et al. 1996) and FindPhone (Bevan 1995) [`www.sil.org/computing/`].

The internal format of the data uses the SIL STANDARD FORMAT, as used, for example, by Shoebox. Table 3 contains a record from the database. Non-roman characters are encoded using capital letters, for example ɔ appears as 'O' in the database, but is correctly rendered in the web browser.

This format is very flexible, and new fields can be added as the need arises. For example, we may want to have multiple pitch-number transcriptions, contributed by different transcribers. Different assumptions about the nature of downstep lead to different tone transcriptions (cf. Stewart 1993). We could equally represent tone sequences at varying levels of abstractness or adopt different theoretical positions (e.g. an analysis using three basic tones instead of two). One could expand the database in these ways, or construct a derived database which retains certain fields while replacing others.

The record in Table 3 also contains an ASCII version of an autosegmental diagram, with asterisks denoting grammatical tones. This format is simple to maintain in the database, and it can be used to generate more readily recognisable diagrams inside a web browser.

For run-time efficiency, the SIL Standard Format is compiled into a one-line format consisting of colon-separated fields, where many of the fields are preprocessed into HTML. As a temporary measure until Unicode [`www.unicode`

```
\re 0001                          # record id
\va                               # validation status
\sp pn                            # speaker
\tn f1                            # tense
\md a                             # mood
\au OH1                           # audio file pointer
\ts L                             # tone on subject
\cl 1                             # noun class
\tv H                             # tone on verb
\op y                             # object pronoun (y/n)
\to L                             # tone on object
\dt [RH]                          # domain type
\tr efO kapte menzwi              # ascii transcription
\pi 3 3  1 1   1  1   35          # pitch numbers
\se e fO a kap te men zwi         # segmental tier
\as | |  | |   |/  |   |          # associations
\t  L L *H H  *H   L   L          # tone tier
\cm                               # comment
```

Table 3: Shoebox entry for an utterance

`.org`] is more widely implemented and adopted, special characters are represented using dynamic fonts, and also translated into small graphics images.[5]

The web interface provides a fill-in form for querying the database. Search expressions can be applied to any of the database fields, and employ 'regular expression' syntax. A pull-down menu is used to select the field. Beside this, there is a checkbox to indicate whether the result should be tabulated according to the values found for this field. And alongside this, there is an area for the constraint to be entered; see Table 4 for examples. This triple—the field name, axis-control checkbox and constraint—query a single field. The form has room for up to eight fields to be queried in parallel, permitting fine control of the search. Only fields which are to be used to constrain the output need to be explicitly constrained. The form also allows the user to control which field(s) should be displayed in the resulting table.

5. Downstep in Bamileke Dschang. This section presents a sketch of downstep patterning in Dschang. It is not my intention here to provide another analysis relating surface forms right back to the underlying (or proto) forms.

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[5] These occupy about 160 bytes each and do not represent a significant overhead for use on the web. In any case, each character only needs to be downloaded once.

Field Name	Values	Notes
Tense	`p5, p3, p2, p1`	past 5 ... past 1
	`pr, pp`	simple present, present progressive
	`f1, f4, f5`	future 1 ... future 5
	`f.`	*any future tense ('.' matches any single character)*
	`.1`	*immediate past (p1) or immediate future (f1)*
Mood	`a, n`	affirmative (=indicative), negative
	`i, c, f`	interrogative, conditional, focus
	`[an]`	*any affirmative or negative form*
Tone (subj)	`H, HL, LH, L`	the lexical tone of the subject noun (after Hyman)
	`HL`	*HL subject nouns: ìmbꜜúŋ, mə̀pꜜúŋ*
Class	`1, 2`	the noun class of the subject noun
	`2`	*the class 2 (i.e. plural) subject nouns (e.g. mə̀lɔ̌ŋ)*
Tone (verb)	`H, L`	the lexical tone of the verb
	`H`	*the H subject nouns: ìmbꜜúŋ, mə̀pꜜúŋ*
Obj prefix	`y, n`	whether the object has the mə- prefix (yes/no)
	`n`	*the prefixless object nouns: sɔ́ŋ, mə̀mbhꜜú, kàŋ˚, nà*
Tone (obj)	`H, HL, LH, L`	the lexical tone of the object noun
	`.*L`	*the tone patterns ending in L (i.e. HL, L)*
Pitches	`1 ... 6`	the pitch transcription
	`(213|324|435)`	*pitch sequences corresponding to L↓HL*

Table 4: Database field values and their use in constructing queries

Rather, I wish to provide a descriptive discussion of the interesting cases which any theoretical account has to deal with, and illustrate the use of the paradigm system to generate useful tabulations. Readers are encouraged to use this discussion as a starting point for their own exploration of the data, sharing intermediate results in the same manner as I have done here.

5.1. Downstep conditioned by low tone. A pervasive kind of downstep in many Niger-Congo languages can be treated using the theoretical construct of 'floating low tones', symbolised here using parentheses, as (L). In this section we review two kinds of (L) tone, one which only lowers a following H tone, and one which lowers all following tones.

Example (6a) shows *mə̀tsɔ̌ŋ* 'thieves' as it appears following a low concord tone. This is the same as the isolation form of the word. We see the plural prefix *mə-* followed by the high tone root *tsɔ́ŋ*, which is realised as rising tone in phrase-final position. In (6b) we see a rather different situation, where the high concord tone is copied (or spread) onto the *mə-* prefix, and the low tone of this prefix shows up as downstep.

(6) a. èfɔ̀ ɔ̀ mə̀tsɔ̌ŋ [-|---|⁄] 'chief of thieves'
b. àsáŋ á mə́tsꜜɔ́ŋ [-|‾‾‾|‾] 'tail of thieves'

This downstep only lowers high tone; the lexical contrast between H and ↓H is neutralised here. Consider example (7), which illustrates this neutralisation for *màmbhꜜʉ́* 'dogs' and *màtsɔ̄ŋ* 'thieves'.

(7) a. àsáŋ á mámbhꜜʉ́ [-|‾‾‾|‾] 'tail of dogs'
  b. àsáŋ á mátsꜜɔ́ŋ [-|‾‾‾|‾] 'tail of thieves'

Regardless of how one chooses to represent the various tones and how one provides explicit formal mechanisms for tones to influence each other, the fact remains that this type of (L) is sensitive to the identity of the following tone. Now we turn to a kind of (L) which is not sensitive in this way. In fact, it lowers EVERY tone after H, regardless of its identity, as shown in Table 5 (cf. Hyman and Tadadjeu 1976).[6] Observe that the final word of each indicative form is downstepped relative to the final word of the corresponding conditional form.

<table>
<tr><th></th><th colspan="2">Indicative</th><th colspan="2">Conditional</th></tr>
<tr><td>L</td><td>èfɔ̀ ɔ̀ kè káptɛ́ ꜜnà</td><td>[-|---|‾‾|\]</td><td>èfɔ̀ ɔ̀ kè káptɛ́ nà</td><td>[-|---|‾‾|\]</td></tr>
<tr><td>LH</td><td>èfɔ̀ ɔ̀ kè káptɛ́ ꜜkàŋ</td><td>[-|---|‾‾|\]</td><td>èfɔ̀ ɔ̀ kè káptɛ́ kàŋ</td><td>[-|---|‾‾|\]</td></tr>
<tr><td>HL</td><td>èfɔ̀ ɔ̀ kè káptɛ́ ꜜꜜmɔ́</td><td>[-|---|‾‾|-]</td><td>èfɔ̀ ɔ̀ kè káptɛ́ ꜜmɔ́</td><td>[-|---|‾‾|‾]</td></tr>
<tr><td>H</td><td>èfɔ̀ ɔ̀ kè káptɛ́ ꜜsəŋ́</td><td>[-|---|‾‾|‾]</td><td>èfɔ̀ ɔ̀ kè káptɛ́ səŋ́</td><td>[-|---|‾‾|‾]</td></tr>
</table>

Table 5: Yesterday past indicative for H verbs with prefixless object nouns

Accordingly, we have evidence for a 'weak' (L) which only downsteps H tone, and a 'strong' (L) which can downstep any tone. Now we turn to (H) and observe analogous behaviour.

5.2. Downstep conditioned by high tone. Consider the ↓H~↓L alternation in example (8). In (8a) we have the ↓H root *ꜜpúŋ* while in (8b) we see the same root (with allophonic voicing) with ↓L tone: *ꜜbùŋ*.

(8) a. màpꜜúŋ ŋ́ kàmtè màtsɔ̌ŋ[-|‾‾|---|/] 'poor men bury thieves'
  b. m̀bꜜùŋ ɔ̀ kàmtè màtsɔ̌ŋ [-|--|---|/] 'the poor man buries thieves'

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[6] Note that the informant did not tonally distinguish *kàŋ* and *nà*, even though the former is supposed to be non-falling (cf. (5f)) and has been verified as such in the speech of Maurice Tadadjeu. I noted significant variation across speakers for the L/Lˋ contrast, with a tendency for collapsing the distinction in many contexts.

Assuming that the phonological representation of ↓H contains a H tone (e.g. as (L)H), this H is absent from any vowel in *m̀ꜜbùŋ*, though it explains the presence of the downstep. Similar examples exist in the associative construction, cf. (9), and with the possessive marker, cf. (10).

(9)	a.	èfɔ̀ ɔ̀ mə̀nzwì	[-|---|\\]	'chief of leopards'
	b.	ɑ̀lə̀ŋ ə̀ mə̀nzwꜜì	[-|---|\\]	'stool of leopards'

(10)	a.	ǹdꜜɔ́ŋ	[-|¯]	'horn'
	b.	ǹdꜜɔ̀ŋ zɑ̀	[-|-\\]	'my horn'

Note, however, that in all these cases, (H)L only shows up as ↓L if there is a preceding L tone. Although (11a) has a ↓L, the conditions are not right for ↓L in (11b).

(11)	a.	ɑ̀lə̀ŋ ə̀ mènzwꜜì	[-|---|\\]	'stool of leopards'
	b.	ɑ̀sɑ́ŋ ɑ́ ménzwì	[-|¯¯¯|\\]	'tail of leopards'

Now we consider a variety of (H) which downsteps the following L regardless of the preceding tone. Consider the items in Table 6. Looking across each row, observe that the only difference is the presence of a ↓L for the H verb and just a plain L for the L verb. Evidently the lexical tone of the H verb is showing up as downstep, and this is not sensitive to prior context. A promising way to approach the problem systematically is provided by Hyman's notion of word domains (Hyman 1985).

	High tone verb: kɑpte *cover*		**Low tone verb: kəmte *bury***	
L	ə̀fɔ̀ ɔ̀ ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[-|--|---|/]	ə̀fɔ̀ ɔ̀ kə̀mtè mə̀tsɔ̄ŋ	[-|--|---|/]
LH	fòk ò ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[--|---|/]	fòk ò kə̀mtè mə̀tsɔ̄ŋ	[--|---|/]
HL	m̀bꜜùŋ ɔ̀ ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[-|--|___|/]	m̀bꜜùŋ ɔ̀ kə̀mtè mə̀tsɔ̄ŋ	[-|--|---|/]
H	ǹdɔ̀ŋ ɔ̀ ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[-|--|---|/]	ǹdɔ̀ŋ ɔ̀ kə̀mtè mə̀tsɔ̄ŋ	[-|--|---|/]
L	mə̀fɔ̀ ɔ́ ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[-|-¯|---|/]	mə̀fɔ̀ ɔ́ kə̀mtè mə̀tsɔ̄ŋ	[-|-¯|---|/]
LH	mə̀fꜜók ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[-|¯|___|/]	mə̀fꜜók kə̀mtè mə̀tsɔ̄ŋ	[-|¯|---|/]
HL	mə̀pꜜúŋ ŋ́ ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[-|¯¯|___|/]	mə̀pꜜúŋ ŋ́ kə̀mtè mə̀tsɔ̄ŋ	[-|¯¯|---|/]
H	mə̀lɔ́ŋ ŋ́ ꜜkɑ̀ptè mə̀tsɔ̄ŋ	[-|¯¯|---|/]	mə̀lɔ́ŋ ŋ́ kə̀mtè mə̀tsɔ̄ŋ	[-|¯¯|---|/]

Table 6: Simple present indicative varying subject and verb

5.3. Word domains. Hyman (1985: 59ff) has identified the PHONOLOGICAL WORD as the prosodic domain in which the majority of Dschang tone rules apply.[7] According to Hyman's definition, phonological words extend from the root of one word, through any suffix, concord marker, up to and including any prefix on the next word. The pitch transcriptions used throughout this paper indicate phonological word boundaries using a vertical bar.

Phrase-internal phonological words appear to be minimally bimoraic. The apparent counterexample of *mə̀fꜜók* in Table 6 evidently contains a silent beat after the *k* in order to satisfy this constraint. (The reader is encouraged to verify this claim by listening to the recording.) The other apparent counterexamples are the mono-moraic auxiliaries for yesterday past (P3) and distant future (F5) in Table 1. The short duration and low intensity of these morphemes seems to place them on a par with affixes rather than full roots, and so they are not assigned their own word domains.

As independent confirmation for the existence of word domains, there is an interesting vowel alternation that may be explained with reference to a limitation on the complexity of phonological words. Consider the phrases in (12), with surface forms on the left and putative underlying forms of the main phonological word on the right. The first two lines use the bisyllabic verb root *kapte*, while the last two lines use the monosyllabic verb root *pok* plus an echo vowel whose morphological status is unclear.

(12) a. ləkɑpte mətsɔŋ [kɑp te mə]$_{\text{PW}}$ 'to cover thieves'
b. ləkɑptɛ nɑ [kɑp te ɑ]$_{\text{PW}}$ 'to cover the animal'
c. ləpoko mətsɔŋ [pok o mə]$_{\text{PW}}$ 'to anoint thieves'
d. ləpokɔ nɑ [pok o ɑ]$_{\text{PW}}$ 'to anoint the animal'

The data in (12) shows that the the concord marker (at least, its segmental content) is only present when the object noun lacks a prefix.

5.4. Towards an inventory of domain types. Table 7 contains a pitch transcriptions which were selected and tabulated using the paradigm system. The left side shows the indicative mood, for H and L tone verbs respectively (see Table 1 for the segmental transcription), and the right side shows the negative mood. As before, each row represents a different 'tense'.

Although there is too much going on in this data to adequately address here, there are some interesting facts about domain types to be gleaned from it. First,

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[7] For another example of tonal behaviour which is sensitive to prosodic constituency, see (Leben and Ahoua 1997).

	Indicative		*Negative*	
	H verb: kɑpte	L verb: kəmte	H verb: kɑpte	L verb: kəmte
P5	[-|---|‾‾|---|-]	[-|---|‾‾|--‾|‾]	[-|---|‾-|‾‾‾|--]	[-|---|‾-|‾‾‾|--]
P3	[-|---|‾‾-|/]	[-|---|‾‾_|/]	[-|---|‾‾‾|--]	[-|---|‾‾‾|--]
P2	[-|-‾-|‾‾‾|-]	[-|-‾-|---|_]	[-|-/-|‾‾‾|--]	[-|-/-|---|__]
P1	[-|-‾|---|_]	[-|-‾|__-|-]	[-|---|‾‾‾|--]	[-|---|‾‾‾|--]
PR	[-|-|___|/]	[-|-|---|/]	[-|----|‾‾‾|--]	[-|----|‾‾‾|--]
PP	[-|-‾|--|---|_]	[-|-‾|--|---|_]	[-|---|‾‾|‾‾‾|--]	[-|---|‾‾|---|__]
F1	[-|-‾|‾‾‾|-]	[-|--|__-|-]	[-|--‾|‾‾‾|--]	[-|---|__-|--]
F4	[-|--|_-|---|_]	[-|--|--|__-|-]	[-|---|_-|---|__]	[-|---|--|__-|--]
F5	[-|-‾‾|---|_]	[-|-‾‾|__-|-]	[-|--‾‾|---|__]	[-|--‾‾|--‾|‾‾]

Table 7: Pitch transcriptions for əfɔ ... mətsɔŋ

consider the final domain boundary of each pitch transcription, along with the relative pitch value on either side. These two pitch values correspond to the word *mətsɔŋ*. Ignoring relative pitch height, there are only three possibilities: [-|-], [-|-], and [-|/]. (But recall that another possibility for *mətsɔŋ* was shown in Table 2.) The three possibilities in Table 7 are the same three that we see for *mətsɔŋ* in the associative construction (Hyman 1985:50), and are laid out in (13), where X stands for either H or L.

(13) a. radical = X, CM = L: [-|/], [-|/]
b. radical = L, CM = H: [‾|‾], [-|-], [-|-]
c. radical = H, CM = H: [‾|‾], [‾|-], [-|-], [-|_]

A tabulation of just the relevant data from Table 7 is given in Table 8. Note that the tabulation is inverted from Table 7; tense and verb tone are classified with respect to pitch information, rather than the other way around. The row labels have been grouped so that the tones on either side of the domain boundary stand in the same relationship to each other. The five non-empty cells are themselves structured according to the lexical tone of the verb. (Thus, Table 8 really has three dimensions.)

The first row of Table 8 corresponds to (13a). The tone on the radical contributes nothing to the tonal behaviour at the domain boundary, showing up elsewhere. I posit a L tone concord marker, provided by tenses P3 and PR in the indicative. This will be classified as [RL]—a domain consisting of the radical tone plus a L grammatical tone. The second row corresponds to (13b). Observe that all the radicals are L. In order to get the desired pitch sequence

<table>
<tr><th>Pitch Sequence</th><th>Indicative</th><th>Negative</th></tr>
<tr><td>[-|′], [-|/]</td><td>H: P3, PR
L: P3, PR</td><td></td></tr>
<tr><td>[¯|¯], [-|-], [-|-]</td><td>L: P5, P1, F1, F4, F5</td><td>L: P2, F1, F4, F5</td></tr>
<tr><td>[¯|¯], [¯|-],
[-|-], [-|_]</td><td>H: P5, P2, P1, PP, F1, F4, F5
L: P2, PP</td><td>H: P5, P3, P2, P1, PR, PP, F1, F4, F5
L: P5, P3, P1, PR, PP</td></tr>
</table>

Table 8: Tense and verb-tone classified by domain boundary type

at the boundary we can posit a H tone concord marker for all L tone verbs in any future tense, and for L tone verbs in P5 indicative, P1 indicative and P2 negative. These will be classified as [RH]. The most interesting case is the third row, which we would like to put into correspondence with (13c). The H tone verbs fit the pattern, so long as we stipulate a H tone concord marker as well, and so these can also be classified as [RH]. However, the L tone verbs break the pattern. Evidently the lexical contrast is not expressed at this position. Nevertheless, we can go ahead and attribute a grammatically conditioned H tone to the L radical in these cases, observing that this radical never shows up overtly, but only as downstep at the preceding domain boundary. This category will be labelled [↓HH].

Since each possibility for *mətsəŋ* represents a set of patterns for the other object nouns, the above procedure can be generalised after the necessary checks have been carried out; it is not necessary to start afresh with each new object noun. In this way, with the help of various stipulations concerning the grammatical tone contributed by the tense and mood, we can see how any analysis of the associative construction can be generalised to cover this position. The next exercise is to work leftwards through each item in Table 7, attempting to classify each domain and each domain boundary in order to determine the tonal contribution of the grammatical construction and to determine the fate of the lexical tones. Those who attempt this exercise—and it is not recommended for the faint hearted—will soon discover that the word domains familiar from the associative construction do not cover all the necessary cases. Attributing tone behaviour at boundaries to the preceding or following domain is especially tricky. I believe it is helpful to consider the possibility that domains condition downstep TO THEIR RIGHT, taking no account of the identity of the tones to be found there (since those tones cannot be seen). This requires the creation of domain types like [RH↓]. We can now distinguish ...H][↓... 'weak (L)' from ...H↓][... 'strong (L)' and ...↓][L... 'weak (H)' from ...][↓L... 'strong (H)'. Furthermore, the occurrence of H↓↓H, only possible at domain boundaries, may then be represented as the sequence ...H↓][↓H...

Whatever the details may be, we proceed by constructing new classifications (in this case, the domain type) for the existing data, and then using this classification in subsequent searching and display. In this way the tool helps to systematise a large body of data, collapsing multiple cases to representative examples, and guaranteeing an analysis having wide coverage.

6. Conclusion. There are many ways to address the challenges posed by the Dschang data. One can enrich the representation of tones by adopting register tones and tonal root nodes (Snider 1990)—the 'paradigmatic dimension'. One can explore the prosodic structures to which tones are associated, assigning tones to non-terminal nodes and to boundaries or providing alignment constraints (Pierrehumbert and Beckman 1988, Hyman 1990) —the 'syntagmatic dimension'. One can refine and elaborate the system of phonetic interpretation, and parameterise it in various ways (Liberman et al. 1993, Bird 1994a). The wealth of analytical possibilities—compounded with the sheer difficulty of providing a complete analysis—underscores the value of making large amounts of primary data accessible in paradigm-like form, and making it simpler for researchers to address one another's datasets in a responsible fashion.

In advocating a technological approach, it has not been my intention to argue against the use of impressionistic transcriptions. In fact, the database described here makes heavy use of such transcriptions, and the interface helps linguists to derive maximum benefit from those transcriptions. Inconsistencies stand out and are discovered at an early stage. Searching transcriptions using numerical sequences avoids the needle-in-a-haystack approach to finding counterexamples, and was neatly illustrated for the L↓HL sequence discussed in §4.2. Equally, it has not been my intention to argue against the use of pencil and paper for exploring field data. After all, working with a page-size quantity of data at a time is about the most someone can handle without suffering cognitive overload, plus it helps the investigator to see and intuitively grasp complex relationships between forms. Again, the technological approach actually facilitates the pencil and paper mode of exploration. The program makes it possible to experiment with a variety of different tabulations of the same data; a useful preliminary step to generating hardcopy tabulations to be analysed away from the computer screen. There are several other advantages. First, it avoids the time-consuming process of producing each new tabulation by hand, for the once-off overhead of entering the data. Second, it avoids the painful process of recopying tabulations in order to rearrange some rows and columns, or substitute new rows and columns, or propagate corrections. Third, it avoids the risk of introducing scribal errors into each new version. Finally, right from the start we are producing layouts that can be reproduced inside physical documents.

This paper has argued for a new mode of investigation in linguistic research based on field data, an approach which combines primary description, theoretical analysis, and tool development. I hope to have demonstrated that this synthesis is both possible and desirable, and I hope to have stimulated the production of improved linguistic software and the construction of shared linguistic resources. Putting digitised speech data and transcriptions on the web along with a powerful search tool makes field recordings accessible, transcriptions verifiable, and a large dataset manageable. Articles whose empirical content is too large for journal publication can make the majority of the material available on the web, avoiding the need for extended appendices in the print document (which have to be laboriously retyped by subsequent analysts). Published analyses of data from relatively inaccessible languages can be scrutinised on external grounds without mounting an expedition. Reanalyses are not limited to endless rearrangements of the data contained in an initial description, driven by purely internal arguments about prior analyses. On the contrary, publishing large datasets supports restudies going right back to the empirical foundations, which is crucial in any discipline having multiple paradigms. The success of this methodology will be measured to the extent that others make new observations about the patterning of tone in the data I have reported here, and devise better analyses.

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REVIEW ARTICLE

Derivations and constraints in phonology. IGGY ROCA, ed.
Oxford: Clarendon Press. 1997. 601 pp. $49.95 paperback.

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1. Introduction. During the rise of generative linguistics in the 1960s, both syntax and phonology were analyzed derivationally. In syntax, this meant that the observed 'surface structure' was treated as the result of a process which began with an initial 'deep structure', then applied a sequence of syntactic transformations; while in phonology, a derivation began with an underlying form, and modified it by applying a sequence of phonological rules to yield the surface (phonetic) form.

After an initial flurry of derivational syntactic analyses, there was a decline in the perceived importance of transformations, spurred on in part by the conflation of rules such as WH-question formation, relative clause formation, indirect question formation, etc. The obvious differences among such constructions were referred to other areas of the grammar, in particular to the lexicon and to conditions on the application of the remaining transformational rules. Generalized Phrase Structure Grammar (early 1980s) went further, in that it replaced transformational rules with phrase structure rules; its offshoot, Head Driven Phrase Structure Grammar, underwent a further metamorphosis in the later 1980s towards still greater reliance on conditions, and less on rules of any sort.

Generative phonologists were historically slower to eliminate rules. While constraints on the application of phonological rules grew in perceived importance, it was not until the early 1990s that anyone seriously proposed the complete elimination of phonological rules in favor of the constraints. Such a purely constraint-based approach is termed a 'declarative' approach (a term from computer science), as opposed to the 'derivational' approach of earlier generative phonology. The book being reviewed is a debate between proponents of declarative and derivational approaches to phonology. It consists of the papers presented at a workshop on derivations and constraints at the University of Essex in 1995.

At present, the principal candidate for a purely declarative approach in phonology is Optimality Theory. The term 'theory' is used broadly here, as

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[*] I am thankful for the helpful comments of an anonymous *NOLx* referee.

Optimality Theory[1] (henceforth OT) subsumes a family of proposals. This is not a criticism of OT, as such variety is to be expected in early stages of theory construction. Nevertheless, the number of variants of OT makes it difficult to argue against it: for every declarative analysis one might show to be inferior to a derivational analysis of some particular set of data, there are numerous other analyses based on variant versions of OT which might fare better, at least on that data. (The same is true for the variety of rule-based analyses one might propose.)

Having said that OT encompasses a variety of approaches, all versions of OT share the following characteristics:

(1) Input words (roughly speaking, underlying forms consisting of the morphemes making up the word) are mapped into an infinite set of candidate surface forms by a function called 'GEN' (for 'Generate'). This set of candidate surface forms may be thought of as the result of modifying the input in arbitrary ways.[2] Hence, for the input *aba*, GEN would produce a set of candidate forms including *aba* (no change), *ab* (deletion of the final vowel), *apa* (devoicing of the stop), *ap* (both deletion and devoicing), *aaba* (lengthening of the initial vowel) etc. etc. ad infinitum.

(2) The set of candidate surface forms produced in (1) is then evaluated against a set of constraints, some of which are ranked as more important (and therefore, less susceptible to violation) than others. For each constraint which a candidate surface form violates, that form is penalized. The form with the least bad high-ranking violation is then chosen as the surface form.

It is important to note that the selected surface form may violate many of the constraints in (2); it is not selected because it does not violate any constraints, but because it violates the high-ranking constraints less severely than any other candidate.[3] The evaluation is performed beginning with the highest ranking constraint and working down. For each constraint, a candidate form is removed from the candidate set if it violates that constraint and there is another form which does not violate that constraint (regardless of how many lower ranking constraints the winning forms may violate).

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[1] Optimality-based approaches have also been explored in syntax, but are not discussed in this book. Optimality with respect to morphology is touched on, but is not in focus.

[2] An anonymous referee suggests that the word 'modifying' may be misleading, since it is reminiscent of the modifications made to forms by phonological rules under derivational theories. The reader should view GEN as a sort of 'black box' that produces candidate surface forms which are more or less similar to the underlying form, but keeping in mind that the inner workings of that black box are at present unknown (and conceivably unknowable).

[3] There are declarative theories of phonology in which constraints are inviolable, but they seem to have attracted less attention than OT.

The set of constraints in (2) is assumed to be universal (although this is, as we will see, problematic). The ranking of these constraints, on the other hand, is held to be language-specific, and it is this language-specific ranking which is said to account for the phonological variety in the languages of the world.

Among the constraints is one constraint—in reality, a family of constraints—called FAITHFULNESS. FAITHFULNESS CONSTRAINTS penalize surface forms that differ from the input form with respect to a particular feature. For example, if an underlying form was *ab*, the candidate surface form *ap* would represent a violation of FAITHFULNESS with respect to voicing, which we might symbolize as FAITHFULNESS(VOICE).

If FAITHFULNESS were ranked highest, the selected surface form would necessarily be identical to the input, regardless of what other constraints it might violate. But there will generally be other constraints in a given language which outrank one or more of the FAITHFULNESS constraints. For example, a language in which word-final obstruents are devoiced might rank a constraint against word-final voiced obstruents higher than FAITHFULNESS(VOICE). In this way, the surface form *ap* would be evaluated as better meeting the constraints than *ab*, because while it violates FAITHFULNESS(VOICE), it does not violate the more highly ranked constraint against word-final voiced obstruents.

There are usually several ways to satisfy any given constraint. For instance, in a language lacking word-final voiced stops, an alternative to devoicing might be epenthesis of a word-final vowel, outright deletion of the word-final obstruent, or even metathesis between the word-final consonant and some preceding phoneme. Hence the candidate forms would also include *aba* (with epenthetic *a* or other vowel), etc. Whether *ap* or *aba* was the preferred form would be determined by additional language-specific constraint rankings concerning faithfulness vs. epenthesis.[4]

Since the universal set of constraints is not known to linguists, but is very much a research issue, it is perhaps too soon to know whether OT will provide a useful way for field linguists to write phonological descriptions. That question is not, however, the focus of the book being reviewed, which rather asks the theoretical question: are phonological rules linguistically real, that is, do they form part of human language? Or are they merely an epiphenomenon: inferences which the linguist can draw, but which in reality follow from the interaction of constraints, and hence are not a real part of language?

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[4] More precisely, the constraint against epenthesis would be a characterized as a constraint against surface phonemes which do not correspond to underlying phonemes. There is an analogous constraint against underlying phonemes which do not correspond to surface phonemes (deleted phonemes), as well as a constraint against re-ordering between underlying and surface forms (i.e. a constraint against metathesis).

The question that the book asks also determines the audience. This book definitely falls into the theory camp; while it might be possible to write a useful description of a language's phonology using OT, this is not clear, and in any case one will not find guidelines for writing such a description here. But for the reader who has heard about OT and wants to know of its strengths and weaknesses, there is probably no better resource. For those familiar with earlier theories of phonology, and wanting a gentler introduction to the theory of OT, there is Archangeli & Langendoen 1997. The works usually cited as being the definitive references to this theory—Prince & Smolensky 1993, and McCarthy & Prince 1993 (the latter with an emphasis on morphology)—have unfortunately remained as manuscripts, although for those with Internet access, they are available from the Rutgers Optimality Archive (http://ruccs.rutgers.edu/roa.html).

2. The papers. The book contains eighteen papers, in three sections. It would be impractical to discuss each paper in detail. I will therefore give a brief summary of most of the papers, before turning to a more detailed analysis of a few, under the topic of 'Optimality Theory and Naturalness'.

2.1 Preliminaries. The first section of the book, entitled 'Preliminaries', contains two papers intended as an introduction to the book and to OT.

Iggy Roca's paper 'Derivations or constraints, or derivations and constraints?' gives a very brief overview of OT (which presupposes that the reader is familiar with derivation-based autosegmental phonology). Roca then proceeds to offer two reasons for thinking that OT cannot be the whole answer, and that phonological rules may still be necessary: opaque rule interaction, and phonological strata. The illustrations are drawn from other papers in the volume, so that this paper serves as a partial overview.

Opaque rule interaction concerns the situation under derivational theories of phonology in which one rule appears to apply (or not to apply) in an environment which is altered later in the derivation by another rule. The earlier rule thus makes crucial reference to phonological properties which are present in some intermediate representation, but not at the surface. The difficulty in arguing about the adequacy of OT from the standpoint of opaque rule interaction is of course that OT does not have any rules; it is the constraints, not the rules, which would have to be rendered opaque. That is, opacity would arise under a constraint-based theory if it could be shown that some constraint made crucial reference to an intermediate representation. But as Roca admits, it is impossible to simply convert the rules of a derivational analysis to constraints. A piece of language data that appears to require opaquely ordered rules may receive a radically different analysis under OT. The opacity argument against OT would therefore be more convincing if a proponent of derivational phonology and a proponent of OT were to debate the analysis of a particular language. Unfortunately, virtually every paper in the book discusses different data by a proponent of one theory or the other, and the reader must trust that the authors' representation of the competing theory's analysis of that data is as good as it could be.

Roca's second reason for supposing that a purely declarative approach is insufficient, has to do with phonological strata. A stratum is a significant level in phonology, such as the lexical level (in which word-internal processes apply) and the post-lexical level (in which processes apply across word boundaries). The use of strata therefore presupposes something of a derivational viewpoint, since there is at least one intermediate representation between the input and the output. While some practitioners of OT have retained strata (albeit in a more or less non-derivational form) from derivational versions of phonology, others have not. Hence an argument that strata are required is not an argument against OT per se, only an argument against certain versions of it.

The other paper in this section is Nicholas Sherrard's 'Questions of priorities: An introductory overview of Optimality Theory in phonology'. Since Sherrard's paper is a tutorial on the theory, not a comparison with derivational phonology, the reader unfamiliar with OT may wish to read this paper before Roca's. Initially, Sherrard's presentation of OT seems quite reasonable, and interesting results—achievable only with difficulty in a rule-based approach—come easily. For example, it has long been known that in languages with reduplicative affixes, phonological processes appear sometimes to overapply, sometimes to underapply (Wilbur 1973). That is, a phonological process may apply to both the base and the reduplicant, when the environment for the process is only found in one or the other (over-application); or else a phonological process applies to neither the base nor the reduplicant, despite the fact that its environment of application is found in one or the other (under-application). Sometimes apparent over- or under-application can be resolved in derivational theories by clever rule ordering. Sherrard (drawing on more extensive work by McCarthy and Prince) shows that OT has a simpler explanation, one which works even where rule ordering does not. The OT explanation comes down to the interaction among three constraints: a constraint requiring the output form of the base (roughly, the stem) to be identical to the input; a constraint requiring the reduplicant to be identical to (the output form of) the base; and the constraint expressing the phonological 'process'.

Results like these should be enough to convince the most skeptical reader that there is something right about OT. But not everything is right, and soon the reader is introduced to the complications. There are universal rankings among the sub-constraints of some families of constraints. These universal rankings are presumably inviolable, unlike ordinary constraints (a point to which I will return in section 3). Then come multiple 'domains' for a single language, each with differing variable ranking. While these resemble the strata of lexical phonology, they differ in that potentially, at least, the ranking of one domain might be the exact reverse of the ranking of another (whereas the ordering of rules was assumed to be the same in all derivational strata for which the rules applied). To this reviewer, these complications negate much of the apparent gain of OT; while OT succeeds in simplifying the sometimes baroque analyses of derivational phonology in some areas (such as the under- and over-application problem discussed below), it introduces intricacy in other areas, a fact which comes up again and again in the other papers.

2.2 Theoretical investigations. The second section, 'Theoretical investigations', contains three papers, of which one (Scott Myers') will be discussed in section three.

'The contents of phonological signs: A comparison between their use in derivational theories and optimality theories,' by Sylvain Bromberger and Morris Halle, suggests that the meaning of symbols like 'æ' or '[+voiced]' is not the same in derivational theories and OT. The argumentation is complex, and it is not clear what the implications of the differences are for the debate between the theories.

The third paper, 'Gradient retreat' by Douglas Pulleyblank and William Turkel, discusses an algorithm (which could in principle be implemented on a computer) expressing how a child might learn an OT-type grammar. The number of universal constraints hypothesized by proponents of OT is quite high (even taking into account that one author's constraints may be rendered superfluous by another's), and the number of orderings goes up as N!, where N = number of constraints. 12! is already a number larger than most pocket calculators can handle, and it is clear that a theory which requires the child to consider all possible orderings of constraints is not plausible. Thus, the issue of learning is clearly crucial to establishing the plausibility of OT.[5]

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[5] The question of rule ordering under derivational theories is less severe, since the number of language-particular rules is presumably much smaller than the number of universal constraints.

2.3 Empirical studies. The third section of the book, 'Empirical studies', is by far the largest. Diana Archangeli and Keiichiro Suzuki's contribution, 'The Yokuts challenge', examines a language which has long been a challenge to generative phonology, Yawelmani Yokuts. Their analysis requires several extensions to OT to handle Yokuts, including constraints on the input, but note (207) that this 'falls foul of one of the most important principles of OT: that there be no restrictions of any kind imposed on the input'. Another proposed modification to OT, that of allowing 'disparate constraints' (constraints between one feature in the input and a different feature in the output, discussed above), is equally inimical to the original world view of OT (a point I will return to in section 3), leaving one feeling that something is wrong.

Three authors call for hybrid constraint / rule systems:[6] Juliette Blevins, 'Rules in Optimality Theory: Two case studies', using data from a dialect of English and from Gilbertese; Carole Paradis, 'Non-transparent constraint effects in Gere: From cycles to derivation' (Gere is a language of the Ivory Coast); and Jerzy Rubach, 'Extrasyllabic consonants in Polish: Derivational Optimality Theory'. I suspect that such hybrid architectures will be fertile ground for theoreticians.

Geert Booij, in 'Non-derivational phonology meets lexical phonology', argues that OT needs something corresponding to the distinction in lexical phonology between the lexical (stratum) and the post-lexical level, with separate 'co-phonologies' (i.e. constraint orders), as well as something like cyclic application. The theory must therefore retain something analogous to serial rule application. Finally, Booij suggests that it is sometimes necessary to give up the idea of a single underlying form for each morpheme, because the alternative is having individually ordered constraint systems for different affixes. Sharon Inkelas, C. Orhan Orgun, and Cheryl Zoll, in 'The implications of lexical exceptions for the nature of grammar', argue that in order to deal with lexical exceptions to phonological processes, derivational phonology is forced to use morpheme-specific co-phonologies, while OT can do without co-phonologies, because constraints are violable. While Booij on the one hand, and Inkelas, Orgun and Zoll on the other, thus consider similar issues, they do so for different data sets, which is unfortunate. One wonders how each set of authors would handle the others' data; one also wishes that the conference discussion had been included in this volume.

Still, the problem does not go away, since it is reasonable to think that many languages have phonologies with 15 or 20 rules.

[6] Virtually all derivational approaches to phonology recognize the need for constraints. What sets the proposals in these three papers apart is the way in which constraint violation triggers rule application.

G.N. Clements, 'Berber syllabification: Derivations or constraints?', comes to similar conclusions as Booij, in that he argues for several phonological/ morphological strata, each with individual constraint rankings. Clements also expresses his concerns about unnatural constraints in OT, a point which will be discussed below.

Morris Halle and William J. Idsardi, '*r*, hypercorrection, and the Elsewhere Condition', come down in favor of derivational phonology, citing as evidence an analysis of dialects of English in which there is an alternation between the presence and the absence of *r*, which analysis seems to require several ordered rules.

Michael Hammond, 'Underlying representations in Optimality Theory', argues in favor of a theory in which morphemes themselves are viewed as constraints (rather than static forms). His approach resembles declarative phonology (Scobbie 1991), but with the difference that Hammond sees constraints as violable (as in standard OT), whereas declarative phonology views constraints as inviolable.

William J. Idsardi., in 'Phonological derivations and historical changes in Hebrew spirantization', discusses historical changes in Hebrew, arguing that OT falls short because the language developed in the direction opposite to what would be expected under OT. Specifically, the derivational approach requires a single change, a rule addition at the 'end' of the grammar; whereas OT requires a number of coordinated changes to go from an earlier stage to a later one. I do not see the force of this argument; grammars are re-invented by each generation, and two radically different grammars might generate nearly the same surface patterns. It is the surface patterns that are more or less accurately passed from generation to generation, not the grammars.

Junko Itô and Armin Mester, in 'Correspondence and compositionality: The Ga-gyō variation in Japanese phonology', discuss a deceptively simple-appearing alternation, which in the end stretches the limits of OT (requiring, for instance, a very odd language-specific constraint). While the OT analysis seems strained, they show that a rule-based analysis is even more complex and ad hoc.

René Kager, in 'Rhythmic vowel deletion in Optimality Theory', tackles the opacity problem posed in Roca's introductory chapter. As Roca notes, it is not obvious how to transform a rule-based analysis into a declarative analysis, because there is no way to directly represent opaque rule interaction using constraints. Kager analyzes a vowel deletion process in Tepehuan which appears to exemplify opaque rule interaction, and shows that it receives a better analysis in OT, without the need for opacity.

Rolf Noyer, in 'Attic Greek accentuation and intermediate derivational representations', argues that the placement of the accent in classical Greek depended on a non-surface (and non-underlying) syllabification, which would be inexplicable under a the usual assumptions of OT.

3. OT and naturalness. This subject of universals vs. language particulars comes up frequently in this book. One of the apparent advantages of OT is that all variation among different languages is limited to re-ranking of constraints; the constraints themselves, unlike the rules of derivational phonology, are claimed to be universal. But then what are we to make of constraints like 'No /ni/ or /ny/ at the start of a prosodic word'? (constraint (88c), page 82, attributed to Cho 1995). It cannot be the case that every combination of two phones is a universal constraint!

Likewise, Archangeli and Suzuki's paper proposes a 'disparate constraint' that an input (underlying) long vowel must correspond to an output [–high] vowel (constraint (12) on page 203). (The term 'disparate' refers to the fact that the constraint relates one set of features—more precisely, moras—in the input to a different set of features in the output.) Again, it is difficult to imagine how this could be universal; is every combination of one set of features in the input and another set in the output a universal constraint?

Another recurring issue is that of universally ranked constraints. Itô and Mester's paper proposes a constraint against word-initial /ŋ/, which constraint in turn outranks a context-free constraint against /g/ ((11) page 425), offering it as

> ... a particular instantiation of the basic scheme... for the analysis of allophonic[7] relations in OT: some constraint with syntagmatic effects is ranked over a conflicting context-free markedness constraint, which in turn dominates a relevant faithfulness constraint.[8]

This constraint has at least some plausibility as a universal constraint, since word-initial /ŋ/ is less common across languages than word-initial /m/ or /n/. (Because OT presumes constraints to be violable, it is NOT the case that every language must obey such a universal constraint across the board.) But now consider some other facts about the distribution of /ŋ/: it is less common across languages in general than /m/ or /n/; it is less common intervocalically than /m/ or /n/; and if a language has word-initial /ŋ/, it will probably also have word-final /ŋ/. All of which is to say that the constraints on /ŋ/ must be universally ranked with respect to each other. If all facts about naturalness are to be handled by positing universal constraints, then each of the constraints on /ŋ/ must be universally ranked with respect to the analogous constraints on /m/ and /n/ and with respect to each other.[9] In fact, establishing a universal ranking of some set of related constraints appears to be the common practice in OT, as exemplified by several of the papers in this volume. Phonological naturalness is thus 'explained' by postulating sets of pre-ranked constraints expressing universal markedness conditions.

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[7] A caution here: the use of the terms 'phoneme' and 'allophone' here does not correspond directly to the usage in structuralist phonemics. While Itô and Mester are not specific, I suspect they would consider any rule with purely phonetic conditioning to be an allophonic rule.

[8] The FAITHFULNESS constraint requires identity in feature values between input and output. As the particular Japanese FAITHFULNESS constraint is irrelevant to the discussion in the text concerning the universality of constraints, I will ignore it here.

But it is not clear to this reviewer that postulating pre-ranked constraints is actually an explanation, rather than a re-statement of the problem. This is perhaps more clearly seen in another pre-ranked constraint set, given by Sherrard (drawing on work by Prince and Smolensky), who postulates the following pre-ranked set of constraints expressing the universal preference for kinds of segments found in syllable peaks (Sherrard's (10-11) page 49; a slightly expanded hierarchy is given by Clements on page 296):

*P/X No X in the syllable peak (nucleus):
*P/t >> *P/n >> *P/l >> *P/i >> *P/a

(That is, *t*—or any obstruent—makes a worse syllable peak than *n*, which in turn is worse than *l*, etc.)

However, while it is undoubtedly true that *a* makes a better syllable peak than *t*, there is something wrong about a constraint against *a* as a syllable peak, no matter how low that constraint is ranked: *a* is the best imaginable syllable peak. What does it mean to have a constraint stating that the quintessential syllable peak cannot be a syllable peak? Clement's paper makes this same point in more detail, concluding that such constraints as *P/a must be excluded in principle.

While eliminating the *P/a constraint succeeds in preventing this particular problem, it only treats one case; the *P/i constraint (and presumably a *P/u constraint) must be retained to account for the common syllabification of /ia/ as [ya] and /ai/ as [ay].[10] While /i/ and /u/ may not make as good syllable nuclei as /a/, it seems wrong to say that there is a constraint against making these vocoids syllable nuclei, because in most cases they serve perfectly well as nuclei.

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[9] An issue arises: if there are universal rankings, can an individual language override them? It is probably too early to answer this question.

[10] An anonymous referee suggests that the *P/i and *P/u constraints could be eliminated in favor of another constraint, such as ONSET, which would require that in syllables beginning with /ia/ or /ua/, the high vocoids be syllabified as the onsets, i.e. as [y] and [w]. But the *P/e, *P/o etc. constraints would still be needed, since there are in most languages no glide equivalents to these vowels, so that ONSET could not do the work here. But if *P/a is

Second, it is true that a universal ranking makes language learning (in the sense of grammar discovery) easier, because the learner need not entertain rankings that violate the universals. However, one must ask where this universal ranking comes from. Some linguistic universals are plausibly innate because they can be seen as the result of a certain kind of computational machinery. Syntactic constraints on long distance movement ('WH-movement'), for example, may result from the way the human parser is built: the parsing algorithm cannot hypothesize extraction sites (gaps) willy-nilly, since that would be computationally intensive, but must instead limit the postulation of such sites to the position immediately after words of a particular category, resulting in the so-called 'COMP-trace filter'—and then only when the parser has already discovered evidence of a trace filler, implying leftward movement rather than rightward movement (cf. Hawkins 1999). Other sorts of universals might be the result of some kind of mapping between components of the mind; the universal division of words into at least the categories of nouns and verbs,[11] for example, might be the result of a necessary mapping between syntax and the semantic faculty. Still other universals might be 'just because': arbitrary facts about the way the human mind works. But many of the universal rankings postulated in OT to explain phonological markedness do not seem to be the result of computational constraints or constraints on mapping, nor are they arbitrary. Rather, they faithfully recapitulate articulatory or even acoustic facts. Now one might argue for the innateness of certain articulatory knowledge. Some articulatory features, for instance, might be the result of the human musculature (or the enervation of those muscles), or limits of the human auditory apparatus. But many phonological universals do not seem susceptible to explanations of this kind. For example, Gafos (1999) argues that in all attested examples of consonant harmony, the harmonizing features are those that describe the mid-sagittal and cross-sectional shape of the tongue tip or blade. Furthermore, Gafos shows that these are precisely the features that can propagate across intervening vowels FOR ACOUSTIC REASONS. If this sort of phonological universal is to be attributed to an innate property of the human mind, then it will be necessary to explain how this knowledge of acoustics

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eliminated because it is simply wrong, and *P/i and *P/u are eliminated because their work can be done by ONSET, we would be left with the strange situation of having only constraints against mid vowels (and consonants) as syllable peaks.

[11] It has been argued that some languages lack this distinction. It is used here only for illustrative purposes.

(something not discovered by linguists until a few years ago) came to be encoded in the genes. On the other hand, if phonological rules have their origin in variation in perception and articulation, then this limit on what features participate in harmony processes has its explanation in the source of the processes, phonetics. In general, it seems to me that looking for a phonological (mental) explanation for every phonological universal is misguided. There are other plausible explanations for universals.

Another case of looking for a phonological explanation for something which might be better ascribed to phonetics appears in this volume in Scott Myers' article 'Expressing phonetic naturalness in phonology'. Myers investigates the common process of assimilation by a nasal consonant to the point of articulation of an obstruent, noting four properties of such assimilatory processes across many languages (126): (1) the assimilation tends to be regressive (i.e. it acts leftward); (2) nasals are the unmarked targets of assimilation; (3) coronal consonants are unmarked targets; and (4) nasal place assimilation is unmarked (more likely than non-assimilation).[12] As Myers notes, it has long been known that there are phonetic reasons behind each of these properties. For instance, in a cluster containing a nasal and an obstruent, the place of articulation of nasal consonants is acoustically harder to identify than that of obstruents, providing a natural explanation for property (2). Myers expresses this fact as the following constraint (his (7), page 134):[13]

> *PL/NAS: Place exclusively associated with nasal is difficult (to distinguish).

Under most versions of OT, constraints are taken to be innate. But Myers observes that an innate constraint like *PL/NAS would simply recapitulate the phonetic explanation, and there would be no justification for this duplication—the innate phonological constraint might just as well contradict the phonetics.[14] The explanation should therefore not be an innate constraint, but rather the result of the acoustic properties of sound, as perceived by the language learner. At the same time, Myers claims that the explanation cannot be PURELY phonetic (as opposed to phonological), because (128):

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[12] See however Mohanan (1993) for how this universal tendency toward nasal assimilation is implemented in different ways in various languages.

[13] An anonymous referee points out that a constraint 'cannot just express a fact about difficulty of perception, but must require or prohibit some state of affairs', while the constraint in the text simply expresses a difficulty. Myers addresses this issue in the context of 'goal-directed behavior': the language learner attempts to reach the goal of clear communication with a minimum of effort, and the easiest way of reaching that goal becomes the adult speaker's natural pronunciation.

[14] An anonymous referee suggests that the phonetic reasonableness of innate constraints might be explained either from a design (theistic) point of view, or from an evolutionary point of view (genes for constraints that made languages easier to speak and hear make their bearers more fit in the Darwinian sense). It is impossible to do justice to these suggestions in this review, much less in a footnote, but I will comment briefly. While the theistic viewpoint may strike a chord with some readers, I doubt that it would sit comfortably with the linguistic

> Phonetic explanations can explain why phonological patterns are the way they are, but they cannot account for the REGULARITY, CATEGORIALITY, or LANGUAGE SPECIFICITY of those patterns. [emphasis original]

How then does this constraint come to belong to a language-particular grammar, if it is not innate? Myers argues that language learners monitor their production, and incorporate constraints into their internal grammars to make their speech easier for themselves to articulate or for listeners to disambiguate (146):

> The speaker's knowledge of what is difficult to produce or to perceive is directly incorporated into the grammar as criteria for the evaluation of potential phonological representations.

While Myers is not explicit about how this is accomplished, apparently what he has in mind is that some constraints are constructed by the language learner from universal constraint schema. Such a move from specific universal constraints to universal schemas of constraints constitutes a major modification of OT.[15] Unfortunately, this solution suffers (it seems to me) from at least as great a difficulty as hypothesizing a universal constraint set. How would the child discover and build the constraints by observing problems with perception? In order to discover the constraint *PL/NAS, one must imagine the child learner observing that place is hard to hear on nasal consonants, and trying to ease this burden on his parents and playmates. This strikes me as implausible. Even more implausibly, the child language learner nearly universally eases the burden not by making the place easier to hear (perhaps by epenthesizing a vowel after the nasal), but by simply obliterating the distinctive place of articulation on the nasal.

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community at large (which is not to say that it is right or wrong). From an evolutionary viewpoint, on the other hand, the emergence of language in an apparently short period of time is currently a mystery; there seem to be few, if any, evolutionary precursors for many properties of universal grammar. Claiming that innate (universal) grammar not only emerged, but evolved into relative perfection during that short time, would be a stretch even for the staunchest evolutionist, I suspect.

[15] Myers is not alone in proposing such a modification; see also Hayes 1996. However, the proponents of Natural Phonology pointed out years ago (see e.g. Stampe 1972) that first language learners seem to start out with large numbers of phonological processes which must then be lost to achieve the adult grammar, making it appear that children did not so much learn the phonological rules of a language as unlearn the rules which were not relevant. Much the same criticism can be made of a theory like Myers' or Hayes' in which the child is required to construct constraints before they can be operative.

Despite the problems with Myers' solution, it is my belief that he has put a finger on a fundamental flaw in OT: the supposed innateness of (all) constraints. The problems which arise from this assumption were pointed out above, namely: the occasional need for such surely non-universal constraints as 'No /ni/ or /ny/ at the start of a prosodic word'; and the fact that if all constraints are universal (encoded in our genes), there is no explanation for the obvious duplication between these inherited traits and the phonetic (acoustic or articulatory) properties of the sounds in question.

There is another difficulty with Myers' approach. He proposes two constraints, *PL/NAS (above); and ALIGN-CV, which states (roughly) that the point of articulation of an unreleased consonant is difficult to perceive. But nasal assimilation only happens when BOTH of these constraints are violated. That is, only the CONJUNCTION of these constraints outranks the relevant faithfulness constraints. Given the way ranking works in OT, this means that *PL/NAS and ALIGN-CV are not (in languages that have nasal place assimilation) distinct constraints: rather, they must take a special conjoined form. Since the two constraints are (according to Myers) not universal, they cannot be universally conjoined; the conjunction must be learned, despite the fact that the effects of the conjunction are undoubtedly more common in languages than the effects of the separate forms.[16] One of the motivating factors for OT was the idea that rule-based theories often missed a generalization, namely that rules conspired together to yield a common result (a particular syllable structure, for example). But if Myers' analysis is correct, then OT must miss a similar generalization: the fact that *PL/NAS and ALIGN-CV often work together to produce the common situation of nasal assimilation.

Myers is not alone in advocating the use of constraint conjunction. While the other OT analyses in this volume do not rely on it, Sherrard's introduction to OT (discussed above) cites other proponents of OT who have advocated constraint conjunction (Smolensky 1995 is a prominent example). If this device is accepted, it makes OT considerably more powerful in the technical sense of being able to generate more 'languages', which is not necessarily a good thing. For example, it makes the language learning task harder if the learner must consider not only constraints and their orderings, but all possible pairwise combinations of those constraints and their orderings.

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[16] A language in which only *PL/NAS outranked FAITHFULNESS would allow only a single point of articulation for nasal consonants. A language in which only ALIGN-CV outranked faithfulness would reduce all consonant clusters to homorganic clusters. To my knowledge, neither situation is as common in languages as that implied by the conjoined form.

In summary, the assumption that OT grammars can make reference only to innate constraints leads to the following difficulties:

(1) The phonetic naturalness of many constraints is stipulated, rather than explained.
(2) Some of the constraints which have been proposed, such as *P/a, are completely UNnatural.[17]
(3) The fact that the ranking of the sub-parts of constraints like *P/X is fixed universally (and in such a way as to make unnatural constraints like *P/a relatively irrelevant) must be stipulated universally (as an innate property of the language learner), which is to say the phonetic naturalness of that ranking is left unexplained.

Constraint conjunction adds the following difficulties:

(4) Some conceptually distinct constraints must be conjoined by the language learner in most languages, so that these conjoined constraints can be evaluated as if they were units; but there is no explanation for the fact that this conjunction is often the normal (unmarked) situation.
(5) The theory is rendered looser (more analyses are available), because all possible pairwise conjunctions of all constraints must be evaluated (or else a large number of constraint conjunctions must be innate, a fact which again can only be stipulated, not explained).

While Myers' proposal explains point (1), and might explain (2), it does so at the cost of requiring language learners to create constraints by paying explicit attention to the difficulties for their hearers occasioned by their speech. Myers' proposal also leaves points (3-5) unexplained. At the same time, Myers (and others) have raised the issue of whether innate constraints are a necessary part of OT. One can imagine an OT-like theory in which the child learning a language DISCOVERS and ranks constraints, even if the particular constraints Myers proposes are not good candidates. Indeed, such constraints might be much more language-specific than the general sorts of constraints that have been proposed in the OT literature.[18]

Generative linguistics long ago set itself a three-fold goal: explaining what a possible language is (language universals); explaining what a 'typical' language is (markedness theory); and explaining how humans acquire natural languages. A theory in which the learner must create language-specific constraints, rather than drawing from a set of universal constraints, might be seen as a step backwards, in that it gives up much of the first and second goals. But if anything has become clear since the birth of generative linguistics, it is that the third goal—explaining language acquisition—is a larger task than we might have imagined. In forty years of generative linguistics, no linguist has come up with a complete and accurate description of any language, while every normal child does so. A theory of phonology that explained only language acquisition would still need to be a very rich theory.

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[17] Of course this may simply be a result of linguists having thus far proposed the wrong constraints.

[18] One can also imagine that a theory using language-specific constraints would have only inviolable constraints, thereby doing away with the need to rank constraints. Declarative phonology (Scobbie 1991) is a theory of this sort.

At the same time, it is obvious that SOMETHING must account for the universals, whether these are tendencies[19] or true universals. One candidate for an explanation would be the diachronic origin of phonological processes in phonetics (Anderson 1981; see Kiparsky 1995 for a recent summary of this view). That is, if there are phonetic reasons why common processes arise diachronically, and why uncommon processes do not often arise, then there is no need to make the DESCRIPTION of the uncommon processes in the phonology any different (more complex, for example, or violating more putative universal constraints). Whether ALL such questions of naturalness can be relegated to phonetics and historical change is, of course, a large and open question.

The same answer may hold of completely unattested phonological processes: if the origin of phonological processes is (largely or entirely) in the phonetics, then the non-existence of a process may be attributable to the lack of any phonetic source. Again, the unattested processes may be equally describable by our innate mental capacity for learning phonology, but humans never need to learn the unattested processes.[20]

Admittedly, this section has been more speculative than what is typically found in a book review. But these are not entirely new ideas. In his discussion of the theory of Natural Phonology, Anderson (1985:346) warns of the danger of 'confusing the projects of description and explanation in phonology'; much of what seems natural about phonological processes, Anderson suggests, may be the result of their origin in phonetics. And my criticism of the hard-wired link between naturalness and constraints in OT is also brought out by Blevins & Garrett (1998:550) in their discussion of metathesis:

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[19] Clements' paper briefly touches on this issue (327). His argument against removing naturalness from the domain of phonology is that no one has identified another area of study that would take on the burden of explaining naturalness. As I discuss in the text, I believe that the right area is phonetics, and that there have in fact been many promising results in this area.

[20] A parallel exists in biology: the genetic code is perfectly capable of describing a creature the size of an elephant, with legs as thin in proportion as those of an ant. But such a creature would collapse under its own weight. The fact that such a creature does not exist is explained by physics, not by limitations of the genetic code.

> …our account and the [OT] account both contend that some changes occur because their input is relatively hard to hear. But the optimization account treats perceptual ease as the GOAL of the change, requiring that language learners have some knowledge of the relative perceptual ease of sound patterns (e.g. in the form of optimality theory constraints). This need not be assumed in our account. We assume only that what is hard to perceive is sometimes not perceived, and that misperception leads to misinterpretation and change…

In other words, Blevins & Garrett content themselves with explaining how metathesis arises diachronically, but argue that it need not have an synchronic EXPLANATION—only a description. Perhaps phonologists would do well to pay more attention to this distinction.

4. Conclusion. One might ask two questions about this debate over constraints vs. derivations: First, who won? And second, who is right? In answer to the first question, to judge by the phonology papers appearing in the theoretical journals now (three or four years after the conference), OT has clearly won the day. Seldom are rule-based phonology papers seen in journals like *Phonology*, *Language*, or *Linguistic Inquiry*. That is not to say that the rule-based approach may not experience a resurgence in the future; after all, the declarative approach in some ways mirrors the notion of allomorphs and allomorph conditions popular during the heyday of structuralist phonology, when sequential derivations were ruled out as being an illicit reference in synchronic grammar to historical processes. Perhaps the pendulum will swing part way back.[21]

The question of which side is right is a different one, and one which I will not attempt to answer. One can only hope that time will tell.

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[21] There is always the possibility that Optimality Theory, like Generative Semantics in the 1970s, will simply die. While there are some interesting parallels, my guess is that this will not happen.

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REVIEWS

A language of our own: The genesis of Michif, the mixed Cree-French language of the Canadian Métis. By PETER BAKKER. 1997. Oxford Studies in Anthropological Linguistics. New York: Oxford University Press. xx+316 pp., Cloth $80.00, paper $45.00

Reviewed by GEORGE HUTTAR
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The last decade or so in linguistics has seen increased activity investigating and documenting not only language death, but also language birth—the rise of new languages, especially through contact between speakers of two or more languages. Michif, the language of the descendants of women from several Native American groups and their French-speaking fur trader husbands, unfortunately appears to be undergoing language death. But this fascinating book is an account of the birth of Michif: what were the particular sociohistorical and linguistic circumstances that have made Michif the unique language that it is? And 'unique' is not too strong a claim to make about Michif, long famous among 'mixed languages' for its combining of its two main source languages in a way roughly summarized as 'verbs from Cree, nouns from French'.

Students of pidginization, creolization, or language contact in general will find much here to reward a careful reading. But what about (other) field linguists? What's in it for you?

First, every field linguist today works in a language contact situation or a potential one, even if that is not the focus of the fieldwork. Most vernacular-speaking communities have some sort of interaction with other ones, and even those that do not have at least the potential of being affected, both sociologically (e.g., prestige; use in schools) and structurally, by languages of wider communication in their environment. A study such as Bakker's (B) is a vivid reminder that whatever language you are studying does not exist in a vacuum, but is part, not only of the community of its speakers, but also of a larger sociopolitical and linguistic complex. What 'your' language will be like, and what it will be used for (and whether it will be used) a few decades from now, is likely to be affected partly by forces outside the language community.

Second, if we look in the past rather than the future, there are probably features in the language of your fieldwork that clearly reflect contact with other languages some time during its history. The phonological oddness of some words, the irregularities of some stems, the peculiar semantics of some lexemes, sometimes turn out to be the result of influence from other languages. In some societies, people's attitudes toward some of these forms can be strongly negative—even though everyone uses the forms every day!—something to keep in mind in developing literacy materials and translating. Again, B's thorough description, while focusing on a particular kind of language contact (which he calls 'language intertwining'), can alert the reader, in an interesting way, to some of the ways that a language reflects its past.

Third, the description of variation in Michif from one location to another, though focusing on the way some locations reflect more French and others more Cree, still will provide some fieldworkers with a useful set of features to keep an eye out for.

Finally, B writes here for nonlinguists, a task that many field linguists (should) undertake. Bakker does it well, providing a good example for others to follow in terms of style and the introduction of unavoidable technical terms. (Some linguists will perhaps find some ideas a bit oversimplified—but you can't write simultaneously for all audiences!)

So just what is in the book, anyway?

Ch. 1, 'Introduction' (3-27), briefly summarizes Michif structure, the role of Michif in our understanding of language contact and historical linguistics, and a number of hypotheses that have been advanced to account for the 'problem' of Michif. These last range from some that can be dismissed easily (e.g., Michif has Cree verbs and French nouns because of the division of labor between Amerindian wives and French-speaking husbands) to some (code mixing; relexification) to which B gives careful consideration throughout the book, ultimately rejecting them.

Chs. 2, 'European-Amerindian contact in the fur trade' (28-51), and 3, 'The Métis Nation: Origin and culture' (52-77), give a detailed account of the historical circumstances giving rise to the Métis and to their language, Michif. B lays a foundation here for resolving the 'paradox' that 'the fur trade is mainly an activity of the woodlands. The Cree part of Michif, however, is basically the *Plains* dialect, spoken almost exclusively on the prairies, where the fur trade was less important' (28). The resolution involves the role of Cree as a lingua franca among many Amerindian groups, including the Ojibwe who were probably predominant among the female ancestors of the Métis, and the annual movements of the Métis westward to the plains, particularly for bison hunting. Some of these historical matters are brought out more clearly in Ch. 9, 'The source languages of Michif: French, Cree, and Ojibwe' (248-276).

Of the intervening chapters, the title of Ch. 4, 'Grammatical sketch of Michif' is self-explanatory (78-117). Ch. 5, 'Variation in Michif' (118-160) and 6, 'Cree-French language mixture: Types and origin' (161-191) together demonstrate that Michif differs from other cases of Cree-French mixing, strengthening B's position that Michif is neither (fossilized) code mixing nor a variety of Cree with heavy borrowing from French.

Ch. 7, 'Ethnogenesis and language genesis: A model' (192-213) will be of the broadest interest, for it includes a comparison of mixed languages with both pidgins and creoles, an overview of a dozen mixed languages from many parts of the world, a 'sociolinguistic and linguistic typology of mixing' (203), and B's strongest presentation of his case for how languages like Michif can arise:

> …certain social conditions of bilingualism can lead to the formation of new, mixed languages. People of bilingual communities who consider themselves separate groups or who need a form of communication unintelligible to outsiders may develop such a mixed language, more or less consciously. In principle, the grammatical system of language A will be mixed with the lexical stock of language B…in the following way:
>
> 1. Bound morphemes (always of a grammatical nature) are in language A.
> 2. Free lexical morphemes are in language B.
> 3. Free grammatical morphemes can be in either language.
> 4. The grammatical system is that of language A.
>
> The result is a mixed language, which I term an 'intertwined' language; the process is called 'language intertwining'.

This chapter is also likely to arouse the most disagreement, challenging some of the current thinking on pidgins, creoles, mixed languages, and language contact generally. Many creolists, for example, would disagree that 'creole languages…are related to one language with respect to the lexicon, but they do not have the grammatical system in common with any other language' (195). Nevertheless, the chapter presents a number of ideas that readers will find helpful in considering language contact situations in other parts of the world, such as B's 'social and linguistic conditions on language intertwining' (208-209).

Ch. 8, 'The intertwining of French and Cree' (214-247), applies the model of Ch. 7 to Michif. Here again there will be reason for skepticism, such as with the statement that 'Cree verbs…consist solely of affixes' (231). Fortunately for the success of the application of B's model to the case of Michif, such a statement is not necessary; elsewhere it is recast more carefully in terms of the fact that Cree ('language A') verb stems are bound, not free, so should according to the model come from Cree, as they do.

Ch. 10, 'The genesis of Michif' (277-280), summarizes well the historical, sociolinguistic, and linguistic argument of the preceding chapters. Reading the entire volume, one comes away with a rich picture of the history of the Métis and their language, an appreciation of the forces that gave rise to this people and their unique language and that also have worked against their survival as a people and as a language, and a wistful agreement with B's concluding assessment (280):

> Unfortunately, many of the Métis still live in conditions of poverty, are victims of discrimination, and maintain fewer and fewer of the traditions of their ancestors. I hope that this book can at least assuage some sorrow for the people whom I respect and love. It is a matter of deep regret that human languages that are threatened with extinction—especially those as unique as Michif—do not receive as much attention as animals in the same situation.

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The projection of arguments. Miriam Butt and Wilhelm Geuder, eds.
Stanford: CSLI. 1998. 371pp. Hardback $64.95, paperback $24.95.

Reviewed by JAMES K. WATTERS
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What determines how many arguments (noun phrases, pronominals) occur in a clause and where? How does this relate to the transitivity of verbs? How does a verb's transitivity relate to the semantic roles of arguments, verbal aspect, and the semantic structure of the verb itself?

These are a few of the issues addressed in this book, focusing on the relation between verbs and the constructions in which they occur. In the introduction, Geuder and Butt clearly summarize the key points of each of the papers. Each summary serves as a helpful abstract, and shows the relation of each article to the other papers in the volume.

For the reader without much background in formal generative theories (GB, Minimalism, HPSG), Croft's 'Event structure and argument linking', the first paper in the volume, is a good place to start. Croft uses the model of Force Dynamics (Talmy 1988) and the profile-base distinction within frame semantics (Fillmore 1985) to provide a very insightful cognitive-typological account of the mappings between semantic arguments and syntax. He also proposes a cross-linguistic constraint on 'possible verbs', and an account of split intransitivity[1].

Croft's final section, presenting a semantic analysis of passive, is the least persuasive part of the paper. While plausible for the English data presented, this account does not seem to be correct for languages in which the function of passive is clearly driven by discourse-pragmatics rather than semantic change in the verb profile (cf. Van Valin 1997)[2].

Several papers in this volume address the issue of treating at least some aspect of transitivity as a feature in the syntax outside the lexical entry of the verb. An important notion that has received attention in recent years and is a unifying feature in approaches here, is the focus on EVENT STRUCTURE as a linguistic concept.[3] The kinds of event structures associated with verbs and clauses fall into classes such as states, activities, achievements, and accomplishments.[4] The syntactic relevance of this classification is referred to by most of the authors in the volume, either as a working assumption or a position to argue against.

In 'Building verb meanings', Rappaport Hovav and Levin present a clear introduction to the distinction between 'idiosyncratic' and 'structural' aspects of verb meaning, and the relation of the latter to event structure and syntax. Like Croft's paper, this can be read with a minimum of theoretical background yet with significant profit for the field linguist. Verbs fit into semantic classes that have syntactic consequences and a common way of capturing this insight is to break down the structural aspects of a verb's meaning into the basic components or primitive predicates, such as BECOME, CAUSE, ACT, and STATE. Particular combinations of these primitive predicates form templates that characterize classes of verbs. Such templates can be augmented in specified ways, accounting for variation in verb meanings and syntactic behavior.[5]

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[1] In many languages the subjects of intransitive verbs display two (or more) distinct morphosyntactic patterns, a 'split' that most often seems to follow semantic patterns. How to account for the relation between the semantic and morphosyntactic differences among such verbs is the subject of much debate. (See Van Valin 1990.)

[2] Croft uses a reader-friendly, iconic notation that has been criticized for not being formal enough. In an appendix he defends this geometric (rather than algebraic) approach as, in fact, satisfying formal criteria and provides a description of his notations. Any fieldworker or typologist that is not comfortable with the algebraic notation in formal linguistics will welcome Croft's notation. Perhaps our natural (human) 'feel' for events and the sentences that describe them is more geometric than algebraic.

[3] We can think of describing the semantics of a proposition in terms of an underlying event seen from a particular perspective. That much is certainly not a new intuition. However, the difficulty of finding a way to make an explicit mapping from event semantics to the syntax of a sentence has hindered its theoretical implementation.

[4] This four-way aspectual (or *aktionsart*) classification goes back to Vendler 1967 (although, like many other ideas, some have traced it back to Aristotle). It has been elaborated in various studies over the years, often in a manner related to the semantic (or thematic or 'theta') roles of arguments. Dowty 1991 is an important article accessible to most NOLx readers (published in *Language*) and is especially relevant here.

Rappaport Hovav and Levin present this work as a framework for further exploration (126):

> [This is] a first attempt at making explicit how verb meanings are structured, how these meanings are expressed in syntax, and how verbs assume extended meanings. In this regard, it is an attempt at a generative theory of verb meaning.

They include a short but helpful appendix contrasting the 'projectionist' view (in which the syntax of a verb phrase is projected from the lexical representation of the head verb) and the 'constructional' view, in which 'the meaning of the verb… appears to vary according to the meaning of the various constructions it is found in.'

Within the 'projectionist' position there is a large literature dealing with how much of this syntax can be directly related to the semantics of verbs and other words that serve as the heads of phrases. In 'Strong and weak projection', Mohannan and Mohannan compare two competing hypotheses (165):

> STRONG PROJECTION HYPOTHESIS: The lexical semantics of a verb determines its argument structure.
>
> WEAK PROJECTION HYPOTHESIS: The lexical semantics of a verb constrains but does not determine, its argument structure.

Surveying data from Kannada (Dravidian), Malay (Austronesian), and Hebrew, they conclude in favor of the 'weak' hypothesis. Their discussion uses a three-way distinction of (a) lexical semantic content (idiosyncratic meaning differences), (b) lexical semantic structure (aspects of lexical meaning that map onto syntactic structure), and (c) argument structure (a syntactic construct). Neither the projection from (a) to (b) nor that from (b) to (c) are one-to-one.

In recent years, there have been investigations not only of how 'content' words (like verbs) are projected onto the syntax, but also of the projection of 'function' words and morphemes, like tense and aspect. In certain frameworks, some of these are associated with the INFL node in a tree structure. Some have broken up the phrase associated with INFL into more specific projections including 'tense phrase', 'aspect phrase', and (the more generic) 'function phrase'. This raises the possibility, in effect, of positing a feature encoding transitivity or some aspect of argument structure at the clause level.

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[5] Levin 1993 is an excellent data source to go along with this paper.

Jelinek's 'Voice and transitivity as functional projections in Yaqui' follows previous work in relating argument structure to a functional head called VOICE. In such analyses (196),

> The INFL component of the clause in universal grammar is the domain where argument structure is selected. Arguments are introduced at INFL heads, and the argument array selected must be compatible with the lexical semantics of the verb.

Ritter and Thomas Rosen, 'Delimiting events in syntax', account for argument structure by movement through unspecified functional heads (F as the head of FP). They argue 'that the number and mapping of arguments, and to some degree the interpretation of the arguments, is determined by the syntactic representation of the event, and not by the lexical representation of the verb' (139).[6]

Noun incorporation (the syntactic 'incorporating' of nouns into verbs) has led some (the 'lexicalists') to argue that such complex verbs are inserted whole into their syntactic position, while others have argued there is a syntactic rule that moves the noun into the verb.[7] Van Geenhoven presents an account of SEMANTIC noun-incorporation in West Greenlandic Eskimo that is distinct from both of the standard positions. (Some familiarity with lambda calculus will be helpful to follow her arguments.)

Kiparsky's 'Partitive case and aspect' provides convincing evidence that what was historically a grammaticalization of spatial relations in Finno-Ugric has developed a function in Finnish of marking 'unboundedness' in the verb phrase. This unboundedness can either affect the interpretation of an NP ('X has some long hairs' vs. 'X has long hair') or of the verb ('shot at the bear' vs. 'shot the bear').

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[6] In an article that appeared in this journal nearly two decades ago, Stephen Marlett argued that in Seri transitivity must be treated not only as a feature of the verb, but as a feature of the clause. Yet at the time most theories of syntax did not allow such a formulation, Relational Grammar and Tagmemics being exceptions. Marlett posed the question, 'Should a notion of transitivity applicable to the clause be made available to grammars?' (1981:25). Articles in this volume offer suggestions as to what an affirmative answer might look like.

[7] As one can imagine, data from one language might seem to support the lexicalist approach, and data from another language the syntactic account.

Ramchand's 'Deconstructing the lexicon' presents data and analyses that challenge two notions well-intrenched in the linguistic literature. First, she demonstrates the inadequacy of the notion of thematic (semantic) roles. While field linguists continue to find the use of labels such as 'agent' and 'patient' heuristically valuable, theoreticians have demonstrated problems with any such inventory for years. However, she goes further to argue that any such theory 'presupposes a type of grammatical system that is unworkable in principle' (75). Second, comparing a few constructions from Scottish Gaelic and English, she argues that the traditional notion of the lexicon as an autonomous component which provides the input to the syntax is not feasible.

The final paper, 'Scrambling and the PF interface', by Neeleman and Reinhart, attempts to account for where arguments show up in the clause, looking at cases of word order variation in Dutch. They account for the variation by means of two factors: a theory-internal notion of Case assignment; and discourse features involving definiteness and focus.

There is a helpful index and relatively few typographical errors. The paperback edition cleverly displays a different sort of 'argument projection' on its cover: a scene from a *wayang kulit*, an Indonesian shadow play.

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REPORT

Amstelogue '99: Workshop on the Semantics and Pragmatics of Dialogue, Amsterdam, May 1999.

Conference report by WILLIAM C. MANN
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1. Overview. This conference proved to be extremely interesting and moving. Here I will give a personal view of what the significance of the Workshop is, both for the field and for SIL.

The title of the Workshop links it to developments in the linguistic subfields of semantics and pragmatics, especially over the last 20 years. The terms SEMANTICS and PRAGMATICS appear in journal titles, but there is no consensus on any sharp distinction between the two. There are mainly personal views, and in any case, such a boundary is a moving target, driven as much by academic politics as by technical considerations. I will call both semantics below (though see Turner 1999 for an opposite view.)

The focus of the Workshop was firmly on dialogue, but dialogue was taken to be simply a most interesting representative of the broader notion of linguistic communication, including monologue. The focus was on modeling communication. Where the distinction is between empirical description and building theoretical models, most of the work is on the modeling side.

To appreciate recent developments, it is helpful to identify some of the prior developments which enable and motivate them. Here is a partial list:

The starting point is TRUTH-CONDITIONAL SEMANTICS as formulated by Tarski (1965). It seeks a method of associating sentences with sets of truth conditions, by asking, 'What are the conditions under which this sentence would be true?' It is sometimes called COMPOSITIONAL SEMANTICS. Generally the convenient working notation has been first-order predicate calculus, although there is no consensus that that notation is adequate.

A second foundational development starts with the SPEECH ACT THEORY of Searle (1969), widely developed since. This theory recognizes that the importance of particular sentences is not all merely in whether they are true or false. It is difficult to see commands, questions, pronouncements of marriage, and other sorts of sentences as true or false. Searle (like Austin before him) identifies sentences as (under certain conditions) performing actions, and seeks to identify what those actions and conditions are.

A third foundation (Searle 1975) recognizes that certain common kinds of sentences say more than their literal interpretation suggests.[1] The paradigm case is 'Can you pass the salt?' spoken at a dinner. Speech act theory analyzes it as a request rather than a question about the addressee's ability. Acts like this are called INDIRECT SPEECH ACTS. In order to identify the request, reasoning proceeds from the situation at the dinner table along with some linguistic conventions. The result both cancels the interpretation of the sentence as a question and provides the new interpretation as a request. This is an early exemplar of a diverse collection of independent developments that seek to explain how what is meant is often not what is literally said.

A fourth foundation also involves derivation of meanings beyond the literal. Work by Grice identifies additional principles on which meanings can be derived. It is often called IMPLICATURE THEORY, see Grice 1989 and 1975 (presented in 1967). There is a principle involving relevance which says 'Be relevant'. This principle could be used, for example, to derive an implicature that a petrol station may be open, in this conversation at a car: 'A: "I am out of petrol"; B: "There is a garage round the corner."' (Grice's example.) If A later finds that B knew that the garage was closed, he has grounds for blaming B, because B's comment turns out not to have been relevant.[2]

There are several other principles, which Grice calls Maxims. Grice presents Maxims of Quantity, Quality, Relation (his name for the one above about relevance), and Manner. He talks about drawing conclusions about particular sentences from the Maxims, using a kind of logical reasoning process. I (controversially) see logic as a metaphor of explanation here. Grice (and all who came after) seems to have had no intention that the principles would be fully explicated. He calls them Maxims rather than axioms, and he calls the derivations Implicatures, rather than implications. These four Maxims, and more that are alluded to but not explicated (including 'Be polite'), are all specific aspects of the Cooperative Principle, embodying the idea that it is in the conversational participants' best interest to cooperate. But see below.

A fifth and very consequential foundation is the THEORY OF LINGUISTIC POLITENESS (Brown & Levinson 1987). Degrees of politeness are explained in terms of various 'face threatening actions' (FTAs). In general most speech acts which somehow involve the addressee can be performed with more than one degree of politeness. The concept of 'face' is central. There are two generic kinds of 'face': positive face (the degree of respect or acceptance expressed toward the addressee); and negative face (preserving the apparent freedom of action of the addressee). One of the effects of politeness theory has been to establish a level of meaning (that which can be done more or less politely; and generally represents the 'corresponding proposition') that is partially independent of literal meaning and truth conditions.

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[1] 'Literal interpretation' has become controversial and many arguments can be raised against it. However, in each of the developments cited below it was initially taken as unproblematic.

[2] This work by Grice is also foundational for Relevance Theory (Sperber & Wilson 1995), which, however, was not cited at the conference.

A sixth foundation has to do with how meanings are conveyed by speakers and recognized by hearers. Grice 1967 developed a sort of INTENTIONALISM, linking the interpretation of sentences to the intentions of their speakers. So, for example, correctly understanding the sentence: 'Your wife is at the door' would involve:

(1) a. the addressee recognizing that
b. the speaker intends that
c. the addressee recognizes that
d. the speaker intends to communicate that
e. the addressee's wife is at the door
f. by saying 'Your wife is at the door'.

This sequence sounds awkward, but it resolves many problems and generally has been part of the basis of current developments.[3] Working from inside out, 1e and 1f differ in that they separate symbols from meaning. 1d guarantees that the meaning is intended rather than accidental (crucially important for irony and many other non-literal cases). 1c guarantees that the meaning is not only intended but conveyed. 1b guarantees that the speaker intends conveyance and non-accidental status. 1a guarantees that beyond speaker intention there is comprehension by the addressee. Once these elements of comprehension are spread out in this way, it can be seen that all of them are ordinarily essential. Ongoing communication requires avoiding accidental meanings in favor of intended ones at multiple levels, and it requires relating symbols to propositions. Inclusion of the roles of speaker and addressee is essential to a reliable account.

A seventh foundation is a widespread recognition that the logic of necessity, deducing from axioms what must surely be so, is insufficient for interpreting sentences. (Generally you can't say that regardless of context some particular M is the only possible meaning of sentence S.) Rather, there need to be inferences (derivations of meaning) that are defeasible; that is, they can be potentially withdrawn if there is some more forceful contradiction. Often called DEFEASIBLE INFERENCE or 'default logic', it is the logician's version of 'all other things being equal'. It allows logical derivation of all sorts of things that were intended by the speaker but not made explicit. (In describing meaning$_{NN}$, Grice says that if a sentence S has a general usage, then its audience can take S to mean$_{NN}$ its meaning, and also says that this conclusion is defeasible.)

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[3] Grice specifically identifies the following advantages, using examples that show that meaning (what he calls non-natural meaning or meaning$_{NN}$, (roughly, a kind of intentional symbolic meaning) distinguishes deliberate from spontaneous acts that have identical effects, distinguishes contrived actions from opportunistically occuring physical conditions, distinguishes simply enabling an audience to draw a conclusion from symbolic expressions which do so, distinguishes stimulus/response effects from meaning$_{NN}$, and distinguishes meaning$_{NN}$ from predictable second order effects (Grice 1989:219-223).

An eighth foundation is the development of a variety of semantics called DYNAMIC SEMANTICS. See Kamp 1981 or Groenendijk & Stokhof 1991. Like compositional semantics, dynamic semantics is still truth conditional, but it has unexpected sorts of consequences. So, for example, if A says 'The moon contains very little iron' and B says 'That's right', then we can deduce that B believes that the moon contains very little iron. Helpfully, we can also deduce that B believes that A believes that the moon contains very little iron. These deductive conclusions have nothing to do with whether the moon really contains very little iron. After we interpret B's statement, we can do a DISCOURSE UPDATE, which is the deductive process by which each utterance updates a representation of the meaning of the discourse content. Dynamic semanticists often argue that this update (of the meaning or interpretation of the discourse so far) is not cognitive, i.e. not equivalent to maintaining cognitive maps of the beliefs of A and B. Rather, it is a direct representation of what the conversational discourse means. Some at the Workshop advocated jointly recognizing both maps of participants' cognitive states and also updates of discourse meaning.

One of the most influential developments within dynamic semantics is DISCOURSE REPRESENTATION THEORY (DRT) identified particularly with Hans Kamp and colleagues (Kamp 1981, 1993). It was used in several of the developments presented at the Workshop.

An extension of DRT intended to resolve certain problems is called SEGMENTED DISCOURSE REPRESENTATION THEORY (SDRT: Asher & Lascarides 1994). SDRT makes active use of coherence relations in deriving meanings, and also uses axioms that represent dialogue participants' goals. SDRT is in a productive phase of development and was itself extended in a paper at this Workshop. There are attractive competing approaches.

These sorts of developments, not always all taken up at once, represent the intellectual working environment for the Workshop.

2. **Papers presented**. There were 19 papers at the Workshop.

A paper by Asher & Lascarides was entitled 'Cognitive states, discourse structure and the content of dialogue'. It uses SDRT as its formal base. It uses rhetorical relations and a modal logic augmented with a defeasible inference operator '>', so that A > B is glossed as 'If A then normally B'. In order to avoid undecidability problems, two intercommunicating logic systems are employed: a first order logic and another one which is a modal propositional logic. The latter is the one with the defeasible inference operator. In the paper it was used to account for anaphoric reference phenomena. A key example is the following:

(2) A says: 'How can I get to Sixth Street?'
B says either: 'There's someone downtown that you could ask.'
or else 'You can ask someone downtown.'
A says: 'What's his name?'

The difference is subtle, but Asher & Lascarides' reading is that the second choice sounds odd because it does not produce an anaphoric antecedent for 'his'. Meanings for the alternative statements by B can be deduced, and they differ in what they provide as potential referents for A's next turn. The theory provides a rich account of the possibilities for resolving anaphoric references, how those possibilities arise, and how they disappear.

For more general purposes the authors have provided axioms labeled Cooperativity, Question-related Goals, Sincerity, Competence, and Practical Syllogism. There is also a formalization of whether, given a question and an apparent answer (any response), the answer is really an answer to the question. They reason toward real answers by assuming that a real answer will advance a plan held by the speaker in which the speaker asks the question for the purpose of making a choice.

We can see from these examples that while it retains the truth-conditional character, SDRT moves far beyond the traditional range of truth-conditional semantics—deciding the conditions under which a sentence is true or false.

A paper by David Traum was entitled '20 questions on dialogue act taxonomies'. It addresses the situation that there are currently a number of taxonomies of what acts can be performed in dialogue. The taxonomies are an unruly bunch. They all seem to lack something that another researcher needs, and the effort to reconcile or even compare them seems to lack a basis on which to proceed. Traum provides such a basis. He does not expect the field to converge into a consensus on one universal set of acts, but he introduces some comparability. His list of questions has the ring of experience and of thought. I expect to use his orientation, perhaps in more than one role, in my own research.

A paper by Herman Hendricks was entitled 'Indirect speech acts, politeness and the civilization process'. Hendricks takes the long view, back more than eight centuries. He asks why we have all of these pesky ways of indirectly, politely interacting. He traces Brown & Levinson's politeness theory (1987) (face theory) and Searle's indirect speech acts (1975) (which are both important characterizations of how we talk,) back across history (mainly European history,) using a historical account by Elias (1993). Hendricks' account thus supports the view that these two theories do not represent linguistic universals, as claimed by Brown & Levinson. Keeping one's linguistic distance, however intricately, is described as an alternative to creating anger and violence. The historical interval represents 'monopolization of violence by the state' and so brings increasing pressure to find another way. That way gets conventionalized, and here we are. In context Hendricks' hypothesis sounds very credible.

Michiel Leezenberg's paper, 'Symbolic power, illocutionary force and impoliteness', noted, and all of the attendees assented, that Grice's Cooperative Principle has become very central to work on dialogue, and probably to many other accounts of communication. It is axiomatized, used diversely and frequently, and is seen as fundamental, almost unquestionable. Nothing will work unless there is something like it in place. But he noted that in present accounts it is far too strong. The Cooperative Principle is part of a much more general frame, because speech acts are social actions. That arena is full of conflict, and conflict has an important theoretical status. People don't always want to advance each other's goals, and verbal conflict and lack of cooperation are very real. Leezenberg notes:

> There are reasons to think that relations of power are at work in the very heart of signification, that is, they are also relevant in semantics. ... Here I will only investigate the more modest claim that they pervade such ... notions as Grice's Cooperative Principle and Searle's rules for carrying out felicitous speech acts.

The upshot was that many of the researchers who have been using the Cooperative Principle as a universal lubricant in their models felt a bit uneasy. Clearly some sorting out is in order.

This is as well a warning to translators. We presume cooperation at a deep level. In non European areas, such as most of Africa, where public anger is ranked as a sin comparable with murder, the rules may be a bit different.

Hans Kamp presented a paper in a DRT framework 'Utterances as transitions between attitudinal states'. This paper was especially encouraging because it presents a view in which language use has CONSEQUENCES, not just structures or actions. It seems to be a step toward a more realistic modeling of human communication. Kamp noted that 'The point of using language is to produce attitudinal change in addressees'. Granted that 'attitudinal' is a technical term here, this is still a giant step toward engaging the forces that drive both language use and language change.

In Kamp's account of dialogue interpretation it is essential for language users to keep track of who is the source of various pieces of information. Modeling this activity is the seed of an account of the evidentiality found in many of the world's languages, and also of an account of how hedging works. It may be an account to which understanding of fiction or pretending to be a lion could be added. To have even the suggestion of such possibilities in a formal model is mind boggling.

3. **Relevance to translation and to SIL.** How is all of this relevant to translation? Clearly translators, at least collectively, should try to understand these technical issues. Non-literal communication, final understandings of text, politeness or the lack of it, implicit or explicit establishment of coherence and some of the other text attributes suggested above can have substantial effects on the quality of translated texts. These sources of quality need to be understood.

Are there other ways in which this collection of developments has an impact on translation? For one thing, it may represent a shift of the leading edge of work in formal linguistics. Possibly it will be excellent without also being immediately influential; that is mostly a matter of academic politics. From the point of view of a working translator, all of this is tremendously preliminary. It has no immediate impact, and may never be more than a framework of thought. But frameworks of thought can be extremely influential and helpful even if they are never literally applied, as Von Neumann has shown with his theory of games (Von Neumann 1953).

What is the relevance of this sort of work for SIL as an organization deeply committed to high quality translation? Two connections are immediate. One comes from how the work is done, and the other from the workplaces and people who do the work.

On methods: Research on language and logic would in previous years be done with pencil and paper. There are limits on complexity of conception and of theory testing that come with pencil and paper methods. These days the work is supported by computation. High complexity can be managed, and unexpected consequences of assumptions can be computed. Many current projects make heavy use of logic engines, which are programmed theorem provers for first order predicate calculus. They play a vital role. Kamp talks about understanding text as 'computing the meaning'.

On people and places: Practitioners of this art come from departments of computer science, philosophy and even sociology as well as linguistics. It is now worthwhile to attend to computational linguistics as well as the traditional places of formal semantics research.

SIL needs to attend to the empirical side of language theory (what real language users actually do) as well as the modeling side (explaining how their languages do those things). Unfortunately, this is not nearly as neat a distinction as it sounds. Specifically on the modeling side, represented by this Workshop, we should notice that a lot of the seminal work on modeling is coming from Europe. We are likely to find the new leadership coming from Edinburgh, Stuttgart, Brighton or Amsterdam. This has consequences in terms of where we encourage people to go for training.

Proceedings of the Workshop will be published in October 1999 or so, probably by the ILLC (Institute for Logic, Language and Computation), University of Amsterdam.

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Lingualinks Bookshelf

The LinguaLinks version 3.5 bookshelf contains some material that exist only in electronic form. Here are brief reviews.

An Introduction to Phonological Analysis, (working draft) February 1999 version, by Stephen Marlett, is both a primer and a first semester course in phonology. To quote Dr. Marlett,

> Phonology is a broad topic of study and currently comprises many theories, each of which requires (at least) a course and a book for adequate treatment. This book is an introduction to phonology in general, and a very brief introduction to the ideas addressed by various of these theories, including generative phonology, lexical phonology, underspecification theory, autosegmental phonology, feature theory, phonemics, and CV phonology. We expect that some users of this book may not find these theories inherently interesting. Nevertheless, someone who wishes to use linguistic theory for practical problems (such as language learning, orthography development, literacy programs) will benefit from learning more about how languages work. Thus we encourage all to jump in and try to master each topic.

Containing 48 chapters, each chapter introduces a discrete topic, illustrates it with language data, gives problems related to the topic, and gives feedback on, or suggested analyses to, those problems. In addition, some chapters contain postscripts for teachers.

Since the book exists in electronic medium format, it contains enhancements that are specially available to this medium: Use of color fonts makes the display appealing to the eye. There are links in the table of contents and the index to referenced pages. Clicking on a page number in these areas take you instantly to that page. Footnotes and feedback to problems are reachable via clickable links. You do not have to flip pages or scroll text to get to such information. The file for this book is displayed via the Acrobat Reader (supplied with the LinguaLinks CD ROM). On opening, the book is displayed in two panes, with the text on the right, and an expandable outline on the left. Clicking on an item in the outline jumps you to the relevant point in the text.

Acoustic Phonetics, chapters 2-5, preliminary edition, by Joan Baart is a clearly written description of how a speech utterance becomes sound waves which are in turn received by a microphone, processed and plotted by Speech Analyzer (SA), a software tool available in LinguaLinks. The text contains numerous color screen shots from SA. Most of these shots are accompanied by a loudspeaker icon, which can be clicked on to hear the utterance upon which the screen shot is based. Since no prior knowlege of the properties of sound waves are assumed, the book starts at a very basic level. This book also displays with an outline pane, so more knowlegeable readers can skip to another point in the book to get the information they need.

LinguaLinks has also copublished the electronic versions of a printed book, *Tools for Analyzing the World's Languages: Morphology and Syntax*, by Albert Bickford (printed by SIL and available at the International Academic Bookstore). Although less electronically savvy than the previous LinguaLinks-only documents, it does contain a side by side outline that makes navigation of the on-line document easy, as well as using color fonts for the electronic edition. The book itself is the fruit of decades of teaching at the University of North Dakota, and is an expansion from and update of John Daly, Larry Lyman, and Mary Rhodes's *A Course in Basic Grammatical Analysis*. (1981. Workpapers of the Summer Institute of Linguistics, University of North Dakota Session 25, Supplement. Grand Forks, North Dakota).

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NEW LINGUISTICS PUBLICATIONS FROM SIL

ASPECTS OF ZAIWA PROSODY: AN AUTOSEGMENTAL ACCOUNT. Mark Wannemacher

The purpose of this study is to provide a generative and autosegmental phonological analysis of the Zaiwa language with emphasis on prosodic components. This is a preliminary phonology of Zaiwa with a relatively complete treatment of all phonological aspects, concentrating on suprasegmental components. The generative/autosegmental framework employed incorporates feature geometry in a manner that provides a view of the interaction of segmentals and suprasegmentals. In particular, the interaction of voice quality, tone, and consonantal features are presented using feature geometry and underspecification in order to differentiate lexical tone from derived tone. It is the author's goal to provide a basis for understanding the processes occurring in Zaiwa phonology and provide helpful insights in understanding similar processes in other Tibeto-Burman languages. Mark Wannemacher has lived in Southeast Asia for eight years and his research on the Zaiwa language has been conducted over the past six years with speakers from various dialect areas.

Pb. ISBN:1-556781-054-2; viii+164 pp., 1998, $29.00

TENSE AND ASPECT IN OBOLO GRAMMAR AND DISCOURSE. Uche E. Aaron

The temporal categories of tense and aspect have received much attention in linguistic literature. But often scholars concentrate on their grammatical description without regard to their function in discourse. This work is a comprehensive and systematic description of the function of tense and aspect in the Obolo language. The data for this study are ten texts, both written and oral, from the Ngo dialect of Obolo, which is spoken in southeastern coastal Nigeria. They represent the four main discourse genres of narrative, procedural, expository, and hortatory. In the model adopted for this work, the discussion of tense and aspect in the sentence correlates with the referential component, while the discussion of the discourse functions of tense and aspect correlates with the textual component. Uche Aaron is a citizen of Nigeria and a native speaker of Obolo. In 1983 he received a Master of Arts degree in Linguistics from the University of Texas at Arlington, and in 1994 he was awarded a Ph. D. in Linguistics from the University of California at Santa Barbara.

Pb. ISBN: 1-55671-063-1; x+90 pp., 1999, $29.00

CHEYENNE MAJOR CONSTITUENT ORDER. Elena M. Leman

Cheyenne narratives exhibit all possible orders for the three major constituents of subject, object, and verb. In this book, the author explores factors that could possibly influence the order of major constituents in Cheyenne narrative. Through the analysis of texts elicited from Cheyenne speakers, she concludes that the newsworthy first principle provides an accounting for alternate constituent order and can be used to predict constituent order. Cheyenne, an Algonquian language, is spoken by Native Americans living in Montana and Oklahoma. The author has done language research with those in Montana since 1975. The theoretical basis of this study comes from her work toward earning a master's degree at the University of Oregon.

Pb, ISBN: 1-55671-015-1; xi+95 pp. 1999. $15.00.

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NOTES ON *LINGUISTICS*

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FROM THE LINGUISTICS COORDINATOR

What's ahead for linguistics consulting in SIL

We never have enough linguistics consultants in SIL. 'Send us more!' —we keep hearing from the fields. The typical field linguist of SIL has a basic knowledge of linguistics, but real language is messy, far more than the sanitized problems we all had in our introductory classes. Thus the need for a corps of consultants, people who have had more formal training in linguistics than the average field linguist, or have had exposure to a wider variety of languages, and preferably both.

So when the field linguist asks: 'How many tones does this language REALLY have?' or 'Why does the word order keep changing?' or 'What are these little particles doing in this story?' —ideally there will be a consultant available to help her or him untangle the puzzle.

Problem-solving is one function of a consultant—training and re-training is another. The introductory linguistics courses of SIL give a good conceptual basis for attacking linguistics problems, but they can't cover in depth the phenomena which are found in certain areas of the world. (As an Africanist, I think of ATR vowel harmony and certain types of tonal phenomena as examples.) Local or area-level workshops and courses are best for this. Unfortunately, we simply do not have enough linguistics consultants to meet the current demand. And I anticipate the next few decades will see a greater, not a lesser, demand for consultants.

Part of the increased need for consultants in the future comes from the increased need for field-based linguistics training I see coming soon. Here are some ideas which are largely dreams at this point. One is to hold linguistics courses for credit on the field. While our field linguists could get the basic concepts in a local SIL school as they do now, perhaps the second round of courses could be held on the field, where again regional phenomena could be emphasized. Africa Area is actually moving in this direction, with a course set planned in Kenya for fall of 2001 which will include segmental phonology of African languages, syntax and morphology of African languages, and tone in African languages. Each course will cover material approximately equivalent to a three credit hour SIL course, and the courses will be taught in blocks, consecutively rather than concurrently.

Another idea is to take a tip from some long-distance educators. Rather than multi-week workshops, we could run very short, intensive sessions on the field, with participants given a six-month 'homework assignment', then the instructors return for another session. I see much of our training for the future being held more in the fields than they have been.

All of these, of course, take qualified people to run them—staffing is the perennial problem for any training program. We will need more consultant/trainers. How can we get them?

One way is to deliberately train such people within an SIL context. In August 1999, my predecessor Lou Hohulin organized a 2-week Linguistics Consultants' Workshop here in Dallas, to help train new and more experienced consultants. We had summary updates on linguistic theory, discussions of the roles of linguistics coordinators and consultants, talks on interpersonal relationships, and much more. We plan to hold another such workshop in July 2000. However, workshops like this can be better adapted to local needs if they are held on the field, and this is our hope for the next generation of consultants' workshops.

The above has been assuming mostly local-level linguistics consultants, those whose scope is basically limited to one country and possibly its neighbors. SIL also has over thirty International Linguistics Consultants, listed inside the front cover of *Notes on Linguistics*, who have a larger scope of expertise and operations. In the years ahead, we will continue to revise and expand this list, and hope to take advantage of these people's know-how a little more than we have in recent years.

Another resource is our International Linguistics Advisors, who are not SIL members, but have been helpful in various ways to us. We hope to avail ourselves of their expertise more in the future.

We would also like to see more SIL members go for advanced linguistics degrees. Having such a degree does not guarantee that one will be an effective consultant, of course—the interpersonal factor is crucial. But a good number of these people would be good as consultants in the future.

All of this will take some time, of course. We cannot expect to see consultants appearing like magic when the new millenium arrives! However, if we in the International Linguistics Department do our part, and the individual field entities release people for appropriate training, I would expect that we could at least double the number of consultants in the next five years. It's a goal worth aiming for.

Mike

—Michael Cahill
International Linguistics Coordinator

Facilitating orthography development with mother-tongue speakers[*]

Leoma G. Gilley
University of Khartoum

1. **Overview**. Beginning in 1994, field linguists in a particular location faced the challenge of having requests to help in linguistic analysis in far more languages than there were personnel available. In addition, there was a growing desire on the part of mother-tongue speakers of the local languages to be involved in the development of their own languages. Over a four year time span, a series of workshops was developed to train mother-tongue speakers with no prior formal linguistic training to analyse their own languages.

This paper summarizes the motivations from within the language community, steps that were taken to develop workable orthographies in the languages whose speakers came to a 'Linguistic Club' organised to provide assistance, lessons learned in the process, and criteria and rationale for the decisions that were made.

2. **Introduction.** In 1994, two individuals held a meeting with members of their respective language groups to discuss the possibility of developing written materials in those languages. After presenting their ideas to an enthusiastic audience, they closed the meeting with promises to work toward fulfillment of those goals. However, there were other languages represented at this meeting, unbeknownst to the organisers. They approached the organisers afterwards and asked if it would be possible for them to develop their languages as well. From this modest beginning, there is now work going on to develop written materials in some 25 languages, most of which have no history of a writing system. Still in 1998, scarcely a month went by without a representative from at least one more new language group coming to request assistance in this area.

When asked about their motivation for writing down their language, almost without exception the answer is: '...to preserve our language and culture for the next generation.' While there may be other motivations expressed, this particular answer is always there regardless of religious or educational background.

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[*] An earlier version of this paper was given at 2nd World Congress of African Linguistics, Leipzig, Germany, 1997. Some information in this published version is left inexplicit for security reasons.

One possible motivator has been the policy of the government that all education should be in Arabic. All primary, intermediate, and secondary education is now taught in Arabic, and most of the university courses are also in Arabic. A second motivator is the displacement of many minority language communities due to the internal conflicts that have raged in the country for the last fifteen years. The combination of displacement and educational policies has resulted in the Arabisation of many children. Their parents seem to have realised that their children are not learning their parents' mother tongue or the cultural values that go with that language. As a result there is a strong desire to make materials available to teach both the language and the culture.

3. Personnel. Members of the various language communities come from all sectors of society and educational backgrounds. Since most of them come from one area of the country, they decided to work together for support and funding. They located a house in which to meet and set up a Linguistic Club or Local Language Centre. Members hold classes, attend workshops or just come there to work on their own throughout the week. Formal classes are held one afternoon each week, taught by various instructors. Many of the participants understand English. However, at the formal classes, most lectures are either given in Arabic or translated into Arabic. Consultants are available for language families such as Eastern Sudanic of the Nilo-Saharan family, or Heiban, Katcha-Kadugli, or Talodi from Niger-Kordofanian. So far, three nationals have received formal linguistics training and serve as consultants for their own languages and as staff for the Centre. Most participants have no training in linguistics, though many are interested in pursuing studies in this area.

As each language group joins the Club it is asked to form a committee to oversee the work. It is expected that members of the committee should represent the various dialect areas and interest groups of that language. It is not necessary for all members of the committee to be literate as some of the better speakers may be nonliterate. The committee's role includes making sure that the materials produced are of good quality. Another aspect of their task is to promote the value of education in the mother tongue in the community and to provide a support and resource to the participants in the Linguistics Club.

4. Alphabet development. The participants in the Club are asked to go through a number of steps in the formation of an orthography, and they are encouraged to bring along whatever help they need from the language community. First, they are given a list of 200 words (in English and Arabic) to write down the equivalent in their language. They are told they can spell the words any way they like. The word lists have places for both singular and plural of nouns and there are some illustrative sentences to elicit different clause types and verbal aspects. The assumption is that the way the words are written will begin to approximate the psycholinguistic perceptions of what is significant to the native speaker. They are told that if a sound sounds different from some other sound, it should be written with a different symbol. Those that sound alike should have the same symbol.

The process is illustrated below initially from the Lumun language (part of the Talodi family of Niger-Kordofanian). In the examples in (1) the mother-tongue speaker has used symbols for: p, b, t, d, ch, j, k and g.

(1)	p	pεirre	chest
	b	öoba	meat
	t	taɽmon	chin
	d	shodo	forehead
	c	chah	head
	j	kujul	back
	k	kunu	ear
	g	chigit	heart

In point of fact, there is only a phonetic difference but no phonemic distinction between voiced and voiceless plosives in this language. Voiced plosives occur intervocalically or contiguous to a nasal while initial and final plosives are voiceless. However, the influence of English and Arabic makes multilingual mother-tongue speakers more aware of the distinction than a naïve speaker would likely be. The next step in the process is an attempt to help mother-tongue speakers understand these patterns.

When the word lists are completed, the group is instructed in a few principles of phonemics. The team is asked to find 10 words with each sound/symbol in the language. In some cases, we see that some words do not appear to fit our allophonic rules since voiceless plosives appear intervocalically (as seen in 2).

(2a) kuɽocho 'feather' uɽocho 'feathers'

Upon closer investigation, we find that these are in fact geminates, and have a fortis quality that results in voicelessness in contrast to the simple intervocalic voiced plosive.

(2b) /kuɽocco/ /uɽocco/

As the participants consider this notion, they may understand it in principle, but it may take more convincing to get the community to agree to write only one set of phonemic symbols rather than both voiced and voiceless phonetic sets. Sometimes the team members can convince the other members of the language community not to add unnecessary letters. On other occasions, this issue returns time and again for discussion. The degree of success often lies with how involved the participants from the language group were during the analysis; the more involved they are the better they understand the rationale for the decision.

What we find is that the consonants are usually pretty clear, with the exception of the plosives mentioned above, but the vowels are another matter. Often, due to the influence of Arabic, vowels are not written at all. If they are written, they are not consistently written (often due to their experience with the inconsistency of English written vowels).

It is sometimes helpful to identify rhythm patterns of words in order to establish how many syllables and thus how many vowels there are in a word. Once the participants begin to write vowels, then the data may be organised and compared to make sure they are consistently written. Likewise, lists can be made to contrast vowel quality, length, and tone.

One example of inconsistency in writing vowels is from Laro (Heiban family of Niger-Kordofanian). Some of the original wordlist from the Laro speakers consisted of words written as [ŋwrnɑ] and [gɽɑ] which upon further examination turned out to be more accurately respresented as [ŋuɾnɑ] and [kɪlɑ]. In the initial wordlist, only five vowels were identified. Upon further study, they had identified eight, and later ten.

Ama (Nyimang) an Eastern Sudanic, Nilo-Saharan language had a previously used alphabet that represented seven vowels. After their initial analysis, the participants had six vowels and three tones. Further work showed that they needed nine vowels and four tones. Tone carries a particularly important load in Ama so that speakers can often more readily identify the tone than they can the vowel.

Almost all of the languages represented in the Club are tonal, but in some languages tone carries a heavier functional load than in others. Speakers of the languages in which tone carries a heavy functional load react quickly to this aspect of the language and they usually have no hesitation in writing tone. It seems that all they needed was to know what it was and have a way to do it. Writing tone meets a felt need. Those who are accustomed to writing dashes and dots over and under letters in Arabic find the decision of how to write tone less problematic than for those who have only had experience with English.

Different strategies were used in different languages to represent tonal contrasts. One group consistently wrote < h > word finally when words ended in high tone. Another distinguished < kw > from < qu > when the < qu > words had a low tone. Since none of the languages they are accustomed to reading are tonal, they had not been introduced to the concept of representing tone. As they understand what tone is, they then determine its functional importance and decide whether it needs to be written.

The outside consultants generally oversee three to seven languages, and thus are not able to spend much time on any one of those languages. But there is usually one 'natural linguist' among the participants from each language group. The consultant's job is to identify those individuals and encourage them to take the lead at this stage. Regardless of ability or previous experience, if properly encouraged, that person does an adequate job of analysis. In some cases, the 'natural linguist' may not be a fluent speaker of the language. However, in our situation, they usually understand the language and are able to communicate with the other members of the group. They seem to catch on quickly to what questions need asking, and are able to come up with tone patterns, minimal pairs or whatever is necessary, in an amazingly short period of time, simply by asking other speakers for the information. In this way, a convincing analysis emerges.

At this point, we found it important to formalise the data collected by the participants and document the insights that were gained. This was done by writing a phonemics sketch in which distribution of sounds and minimal pairs are defined. It may not have been clear to all participants why they are going through this stage. However, with all participants going through the process they gain a reasonable understanding of why they use certain letters in the orthography.

The next step had participants choosing the letters for the orthography. None of the groups chose to write in Arabic script, even though they are all more comfortable with Arabic. They consistently perceive their languages as being unrelated to Arabic, and therefore incompatible with Arabic script. Since most of the languages have five or more vowels, this perception is not without basis.

At this stage participants and consultants discussed practical considerations in selecting letters. For example, to foster self-sufficiency, the language community might avoid symbols that are not easily found on a computer, such as the upper ANSI set. To select symbols not already there, their use could necessitate more training in computer technology. (In the ever-changing world of computer technology, this can rapidly become a liability.) Likewise, if the symbols chosen are available in major language alphabets, then typewriters should also be obtainable and usable for areas where computers are not an option.

Choosing letters is never easy and we have seen some novel choices. The Laro needed initially to represent eight vowels. They chose consonants, rather than digraphs or diacritics for some of these vowels, so that < x, v, h > stood for [ɪ, ʊ, ə] respectively. As further work was done, it became clear that there were two distinct tongue root position sets and vowel harmony within the sets. They needed two additional vowels and they wanted to show the relationship between the vowels. As a result, they decided to use an umlaut to mark the advanced tongue root set.

After the alphabet was determined, the team then rewrote the original wordlist using the new orthography. This step has two important results. First, the team gets accustomed to spelling words with the letters available. Sometimes new issues such as combinations of consonants or vowels within syllables come to light. At other times, word break issues arise, especially with compound words. A second result from this step is that a literacy team will have a set of words to use for making alphabet charts or alphabet books, which in turn can be used to test the new orthography.

5. **Testing**. To foster widespread acceptance and use of the orthography by the language community, each group participating in the Linguistic Club is assisted in making an alphabet book which consists of pictures and single words. Twenty copies of this book are produced to show to the committee and other members of the language community for approval. Often there are celebratory dances to commemorate this great event in their group's development.

Ideally the Linguistic Club committee for each language group will be representative of the dialects of the language group. We find on occasion that this is, in fact, not the case. Then it becomes necessary to add members to the committee so that it will be representative. Once approval is obtained from the committee, and the necessary and inevitable changes made, a larger printing of 200 copies is produced so that more members of the community can have opportunity to evaluate and learn. Classes are often started among the youth to test the readability and acceptability of the work.

At this stage, difficulties may arise because of dialectal variation. Sometimes participants and committees alike will initially say 'We all speak the same!' However, as the language is written down, it may not look quite like some of the group say it—and putting it on paper brings out these differences. In the case of Asharon (Talodi family of Niger-Kordofanian) there are two major dialect areas—eastern and western. They have roughly the same number of speakers and neither is considered to have greater prestige.

Some of the dialect differences that had to be (and are still being) resolved include pronunciation of certain sounds, differing numbers of syllables in a word, and different noun class markers for a word. For example, one dialect says [z] where the other dialect says [θ]. In a smaller set of words, the first dialect says [s] while the other uses [z]. The solution proposed was to write < z > for the first set and < c > in the second (as there are no palatal plosives in this language).

When there is a different number of syllables in a word, such as between [billerak] versus [biller] or [go'rolak] versus [go'rol] the solution proposed was to write the longer form so that the maximum amount of information would be available. Where the differences were to put nouns in different classes, there does not appear to be a simple way to reconcile that difference. Each one writes the word as they say it.

6. Further language development. Further courses are offered to enable participants to teach writing (using a Roman-based alphabet) while teaching the alphabet book. In this writing skills course they begin to transcribe stories that they have collected on tape from elders in the community. The transcription practice has several advantages. They have some well-told stories to use for further publications, they can also be used for further phonological and grammatical analysis, and the writers can concentrate on letter and word formation and spelling rather than having the added task of thinking of content. As they write the language, they typically encounter difficulty in handling word breaks and morphological changes of words. These can then be discussed and some tentative solutions found.

Once they have become more proficient in writing their language, they attend various writer's courses to learn techniques of writing (in contrast to telling) folklore and also personal experience stories. In this way, they learn to produce their own literature and educational materials. Further workshops teach skills such as editing, production, preparation of manuscripts for a printer, and desktop publishing skills.

Throughout this process, there are courses for studying the grammar (on fairly elementary levels), more phonology, and discovering ways to make simple primers, grammars, and dictionaries. Participants are encouraged to test their materials with many people in the language community and are instructed on how to do this. The committee members continue to serve as the representatives of the language community for approval of the material.

7. Conclusion. A prime consideration in the system summarized here is for each language community to have a say in all aspects of the development of its language, and for them to be as self-sufficient as possible in carrying out the goals of their language community.

As a poignant example, we learned through the process that it is very important for the members of the team, at the earliest stage, to actually write down the word lists themselves rather than for an outsider to do it. While the outsider might initially be able to do it faster, it conveys a lack of confidence in the ability of the team to do the work. If this idea is reinforced too often, then they can become dependent on the outsider to continue the work rather than assuming responsibility themselves.

We would like to see more participants getting degrees in linguistics so that they can continue more in-depth analyses of their languages. We also hope to publish a collection of the work that has been done so far.

One difficulty we encountered resulted from much of the language development work having been in a large city, away from the traditional homeland of the language community. There were some complaints from the homeland that the language development was distorting the language. We found that those involved in the work itself need to be in regular contact with people from the home area to keep them informed and to be able to defend their choices and explain to their countryman how they reached the decisions they made.

A final consideration involves funding. Local centres in the capital offered basic computer training, and money from sponsors such as the Ford Foundation provided money for computers and printers for use by these groups. However, with the expense of printing and distributing material in more than 25 languages, funding remains a significant challenge.

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Lingualinks Bookshelf
Plans for Version 5.0

Version 5.0 will come out in January 2001, a full year after version 4.0. In addition to adding new books, we are especially looking for contributions from field entities in the area of language family descriptions and areal language phenomena (see, as an example, Rod Casali's bibliography of ATR/RTR). These descriptions may be used by entities to fulfill research requirements, to orient new personnel, and to attract researchers.

—Paul Thomas
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REVIEWS

University College London working papers in linguistics 8. By PHILLIP BACKLEY and JOHN HARRIS, eds. 1996. London: University College. 623 pp. (£15)

University College London working papers in linguistics 9. By PHILLIP BACKLEY and JOHN HARRIS, eds. 1997. London: University College. 432 pp. (£15)

Reviewed by SEAN D. ALLISON
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These working papers are reports by staff and postgraduates of the Department of Phonetics and Linguistics, UCL. This review deals specifically with volumes 8 & 9 (for 1996 and 1997 respectively). Each volume is divided into sections for different language sciences: Semantics and Pragmatics, Syntax, and Phonology. Reports on phonetic research in the Department appear in the publication, *Speech, Hearing and Language*.

Volume 8 begins with an additional section labeled General. The only article in this section, 'Modules and quasi-modules: Language and theory of mind in a polyglot savant', is by Neil Smith and Ianthi-Maria Tsimpli. The purpose of the article is to examine the nature of a Theory of Mind Module (ToMM). The authors report RESULTS from false belief tasks performed by an autist and claim that these results support the position that the ToMM for the given subject is quasi-modular.

The two volumes proceed with a total of fifteen articles in the domain of Semantics and Pragmatics (eight in volume 8 and seven in volume 9). The vast majority of these are written within a relevance-theoretical framework. Translators have appealed to this theoretical approach when wrestling with how (and if) one should render implicit information from the source text in the target text (cf. *Notes on Translation* 9(1):1-15, 10(4):18-30, and 11(1):19-26. In addition, see *Notes on Linguistics* 39:5-24 for a brief introduction to Relevance Theory).

The eighth volume includes a proposal to analyze the pragmatic processes of enrichment and loosening symmetrically ('Enrichment and loosening: Complementary processes in deriving the proposition expressed' by Robyn Carston). There is also an interview with Deirdre Wilson ('Questions on Relevance' by Isao Higashimori & Deirdre Wilson) clarifying some of the changes made to Relevance Theory in the Postface of the second edition of

Relevance: Communication and cognition (Sperber & Wilson 1995). As well, another article discusses how discourse connectives (such as *but, moreover, therefore, so,* etc.) contribute to utterance interpretation ('Discourse connectives: What do they link?' by Villy Rouchota). The other titles in the Semantics and Pragmatics section of volume 8 are: 'Pro-active focus' by Richard Breheny, 'The implicit expression of attitudes, mutual manifestness, and verbal humour' by Carmen Curcó, 'Event variables and Davidson's program in semantics' by Barrie Evans, 'A relevance-theoretic account of metarepresentative uses in conditionals' by Eun-Ju Noh, and 'On generics' by Anna Papafragou.

The Semantics and Pragmatics section of volume 9 includes an argument against a relation of duality between concessive and causal constructions ('Because and although: A case of duality?' by Corinne Iten). Another article links the progression in the use of different modal meanings (i.e. from root modal meanings to epistemic ones) in child language development to the development of a child's theory of mind ('Modality in language development: A reconsideration of the evidence' by Anna Papafragou). A third paper claims that there exist more mental concepts than public words. From this position, the authors argue in favor of an inferential theory of communication (i.e. Relevance Theory) as opposed to a code theory of communication ('The mapping between the mental and the public lexicon' by Dan Sperber & Deirdre Wilson). The other articles in the Semantic and Pragmatic section of volume 9 are: 'A unitary approach to the interpretation of definites' by Richard Breheny, 'Relevance-theoretic pragmatics and modularity' by Robyn Carston, 'Conceptual and procedural encoding: Cause-consequence conjunctive particles in Japanese' by Michiko Takeuchi, and 'Immediate contexts and reported speech' by Seiji Uchida.

Within the Syntax section of these volumes, there are also fifteen articles in all (nine in volume 8 and six in volume 9). In most cases, the authors take a Minimalist approach to the syntactic issues examined, although a few of the articles are set in the context of the dependency-based Word Grammar theory (Hudson 1984). In one article in volume 8, the author looks at why self-embedded structures, such as *The rat the cat the dog chased ate died*, are difficult to process ('The difficulty of (so-called) self-embedded structures' by Richard Hudson). He provides an explanation based on the semantic structure of these syntactically complex sentences. In another article couched in Word Grammar theory, the author considers the possibility of reducing the number of grammatical relations of the theory to one type—licensing ('Dependency, licensing and the nature of grammatical relations' by Christian Kreps). In this scenario each head licenses its dependent either through mutually-sponsored licensing (as in the case of the verb and its argument(s)) or dependent-sponsored licensing (for adjuncts).

The other titles in the Syntax section of volume 8 are: 'A minimalist view of the syntax-lexical semantics interface' by Maya Arad, 'Checking theory: Features, functional heads, and checking-parameters' by Annabel Cormack & Neil Smith, 'Strong features, pied-piping and the overt/covert distinction' by Hans Van de Koot, 'Missing arguments in earlier English clause structures' by Fuyo Osawa, 'S-dependency' by And Rosta, 'Aspectuals in Cantonese: The case of *saai*' by Yu-Yan Anne Teng, and 'Configurationality and Greek clause structure' by Dimitra Irini Tzanidaki.

The status of functional categories is the subject of one article in the Syntax section of the ninth volume ('Syntax without functional categories' by Dick Hudson). In this article, the author argues against the notion of FUNCTIONAL CATEGORIES. He examines, in particular, the case of determiners and complementizers, which he claims, are regarded as the least controversial examples of functional categories. If he can demonstrate that determiners and complementizers are NOT functional categories, then the author feels justified in calling into question the very existence of functional categories. Working from the principle that 'a word-class should be recognized only if it allows generalizations which would not otherwise be possible', he comes to the conclusion that determiners can be included in the category of nouns (via pronouns) while complementizers do not form a separate word-class at all. The other Syntax articles in volume 9 are: 'Mirror theory' by Michael Brody, 'Checking features and split signs' by Annabel Cormack & Neil Smith, 'Agreement phrases in DP' by Young-Kook Kim, 'Null subjects without pro' by M. Rita Manzini & Leonardo Savoia, and 'Result clauses and the structure of degree phrases' by Jonathan R. White.

The sections on Phonology within the two volumes contain a total of nine articles (five in the eighth volume, four in the ninth), the majority of these being written within the context of Element Theory. In the first article in the Phonology section of volume 8, the authors reexamine how Element Theory handles cases of vowel harmony ('Activate α: Harmony without spreading' by Phillip Backley & Toyomi Takahashi). In order to maintain a highly restrictive interpretation of the notion of Structure Preservation (at prosodic AND melodic levels), the authors propose 'a view of melodic structure in which every position contains a full set of elements'. In this way vowel harmony is not accounted for by a change in head-complement relations (which would alter melodic structure) but by a lexical instruction to activate a latent prime which is already present within the melodic template.

The remaining articles in volume 8 are: 'Edge-licensing in chanting contours' by Mercedes Cabrera-Abreu & John Maidment, 'Phonological output is redundancy-free and fully interpretable' by John Harris, 'An experiment with tone' by Phil Harrison, and 'Constraint ranking, Government Licensing and the fate of the final empty nuclei' by Krisztina Polgárdi.

Within the elemental model, [e] is phonologically more complex than [ɛ]. In one article in the Phonology section of volume 9, The author proposes to test this claim experimentally in a language with front-mid vowel height contrast ('The relative complexity of Catalan vowels and their perceptual correlates' by Phil Harrison). After producing synthetic tokens of prototypical F1 and F2 values for the front-mid vowels of Catalan, the author carries out adult perception tests using native Catalan speakers with English controls. His results show no clear link between perception and complexity (i.e. the phonologically more complex [e] is NOT more difficult to perceive). The other articles in the ninth volume are: 'Monovalency and the status of RTR' by Phillip Backley, 'Prosody and melody in vowel disorder' by Sally Bates, John Harris & Jocelynne Watson, and 'Melodic structure in a nasal-voice paradox' by Kuniya Nasukawa.

As the perseverant reader of this review can tell, the collection of articles in these two volumes is quite diverse. In general, the authors' interests are in extending, modifying or verifying specific aspects of a particular theoretical model.

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Psychology for language teachers: A social constructivist approach.

By MARION WILLIAMS and ROBERT L. BURDEN. New York: Cambridge University Press. 1997. 250pp., $54.95 hardback, $20.95 paperback.

Reviewed by RONALD ANDERSON
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Psychology for Language Teachers is relevant for field linguists because it contains many insights useful to those of us who try to learn a language on our own. This was not the intention of the authors, but when we must teach ourselves, we take advantage of whatever resources we can find. The authors' approach is CONSTRUCTIVIST because it draws from the work of

Jean Piaget, Jerome Bruner, and others, in which individuals 'construct' their understanding of the world through meaningful experiences. The authors' approach is also SOCIAL because it draws from the work of Lev Vygotsky and others, in which the social or interactional requirement of learning is emphasized. After explaining these useful approaches, Williams & Burden (W&B) propose classroom practices that are less useful for the field linguist.

Piaget's constructivism is a reaction against the notion that learning is the accumulation of skills and facts. According to the authors, 'the main underlying assumption of constructivism is that individuals are actively involved right from birth in constructing personal meaning, that is their own personal understanding, from their experiences' (21). In this theory, learning comes from doing. The mind is seeking EQUILIBRATION, adjusting what is already known to what is being experienced. This comes through the processes of ASSIMILATION, ACCOMMODATION, and ADAPTATION. An example of assimilation might be fitting a newly learned adjective into its place among other words in our growing lexicon. An example of accommodation is changing our understanding of the other words in our personal lexicon in light of the new one. An example of adaptation is when we discover that a particular adjective collocates with certain nouns but not with others, in which case our current understanding of the language changes. We are continually constructing our knowledge of the language.

Bruner's cognitive approach stresses the importance of developing conceptual understandings and cognitive skills and strategies. Meaning is very important, and coming back to a topic of study again and again will bring new insights. The authors state that we need to develop 'the learner's ability to analyze the language, to make guesses as to how rules operate, to take risks in trying out the language, and to learn from their errors' (26). Bruner would have the field linguist use a new adjective in several contexts to discover the range of meaning and collocations.

Lev Vygotsky sees meaning as central to any unit of study—any unit of study will be presented with all of its complexity, rather than as skills or knowledge in isolation. He also notes the necessity of having the mediation of someone more competent than the learner to aid instruction. For the field linguist, this may be a more experienced linguist, or a native speaker who will provide the learner with natural language.

The authors also recognize the uniqueness of the individual in the learning task. They claim (61-2) that worthwhile learning;

- is a complex process;
- produces personal change of some kind;

- involves the creation of new understandings which are personally relevant;
- can take a number of different forms;
- is always influenced by the context in which is [sic] occurs;
- results mainly from social interaction;
- often needs to be mediated;
- differs from individual to individual;
- is an emotional as well as a cognitive process;
- is closely related to how people feel about themselves;
- is a lifelong process.

W&B discuss the importance of motivation, self-concept, and setting goals in the social constructivist approach to language learning. They also suggest several strategies for teaching and learning. Though a couple of the latter chapters focus on specific classroom settings that most field linguists will not identify with, the greater part of the book presents a detailed theoretical foundation of language learning.

Because field linguists need to set their own goals and choose their own strategies, the ideas from *Psychology for Language Teachers* can stimulate new, imaginative approaches. Field linguists who also work on literacy projects will get a good introduction to educational theory that is becoming more popular around the world.

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Reference and referent accessibility: Pragmatics and beyond. By THORSTEIN FRETHEIM and JEANETTE K. GUNDEL, eds. 1996. Amsterdam & Philadelphia: John Benjamins. 312 pp. Cloth $85.00

Reviewed by MICHAEL BOUTIN
SIL—Malaysia Branch

The publisher's announcement for *Reference and Referent Accessibility* (RRA) states:

> The papers in this volume are concerned with the question of how a speaker's intended referent is interpreted by the addressee. Topics include the interpretation of coreferential vs. disjoint reference, the role of intonation, syntactic form and animacy in reference understanding, and the way in which general principles of utterance interpretation constrain possible interpretations of

> referring expressions. The collection arises from a workshop on reference and referent accessibility which was held at the 4th International Pragmatics Conference in Kobe, Japan, July 25-30, 1993.

Much of the work in RRA was stimulated by a paper that appeared in *Language* just before the Kobe Conference. Both this volume and Gundel, Hedberg and Zacharsik's (1993) seminal paper are interested in how different referring expressions (i.e., linguistic forms) constrain possible utterance interpretations.

Before we explore the contents of RRA, let's consider why the issues described in this book are of fundamental importance to field linguists and translators. Most field linguists (myself included) spend the majority of our linguistic analysis time describing the phonology, morphology and syntax of a language, and, in some instances, we even manage to come up with a fairly interesting catalogue of forms and constructions. However, due to diverse demands in field projects we rarely answer the question of when to use one form or construction as opposed to another. Thus, although we might have a very nice catalogue for advertising our linguistic fashions, when it comes to making choices during translation we normally resort to native speaker experts. While I am not advocating replacing native speaker expertise, it is nice when native speaker choices confirm our linguistic analyses as opposed to simply using a form or construction because a native speaker says so. Where then do harried field linguists find help in choosing between alternatives in their linguistic catalogue? The typical pat answer is either discourse or pragmatics; however, for some of us, the land of discourse and pragmatics appears to be a bottomless pit where, if we venture in, we fear that we may never crawl out.

Alas! Information structure appears to be a relatively safe route into the land of discourse and pragmatics because it provides a concrete link back to the familiar territory of phonology, morphology and syntax. In fact, much of morphology and syntax is driven by information structure—for example, the correlation between word order and referential status with old information typically occurring before new information. Indeed, all languages have a system for marking the introduction of new information and for recalling old information.

While information structure is concerned with how speakers tailor their utterances according to their beliefs about the mental state of hearers, reference is that aspect of information structure that deals with how people talk about entities and states of affairs. Stated in perhaps a more familiar way, reference is concerned with keeping the 'files' straight (cf. Elkins 1981). RRA deals specifically with the choices a speaker makes between different forms of NPs. RRA employs a wealth of examples to provide detailed analyses of the function of various referring expressions. Major contributors to the volume include Mira Ariel, Wallace Chafe, Östen Dahl, Jeanette Gundel, Marianne Mithun and Ellen Prince. The papers contain data from a number of languages including English, Finnish, Fox, Hebrew, Irish, Korean, Mandarin Chinese, Norwegian and Vietnamese.

RRA begins with a brief introduction summarizing the goal of each paper. The papers are then arranged alphabetically by author. This arrangement strategically places Ariel's paper first in the volume. Ariel turns out to be the most cited person in the volume, largely because her Accessibility Theory is central not only to her own paper 'Referring expressions and the +/- coreference distinction', but also to papers by Rachel Giora & Cher-Leng Lee 'Written discourse segmentation: The function of unstressed pronouns in Mandarin Chinese', Helena Halmari 'On accessibility and coreference', and Janine Toole 'The effect of genre on referential choice'. Accessibility Theory is also briefly discussed by Christina Hellman 'The "price tag" on knowledge activation in discourse processing' and receives at least an honorable mention by several other authors.

The fundamental claim of Accessibility Theory is that the primary function of various referring expressions is to mark different degrees of accessibility in memory. Ariel claims that different referring expressions actually signal different processing instructions to language users. Speakers first consider the degree of accessibility of the mental entity for the addressee—then they choose an appropriate referring expression that is available in the language. Referring expressions are arranged in terms of a scale of accessibility so that each expression marks a relatively lower degree of accessibility than the previous expression. There is an inverse correlation between accessibility and linguistic forms. Highly accessible entities are encoded as unstressed or empty pronouns, whereas entities with low accessibility are encoded using longer linguistic forms.

The second most frequently used approach to the problem of reference in this volume is based on Gundel, Hedberg and Zacharsik (GHZ) (1993). While GHZ, like Ariel, receive at least an honorable mention by most other authors, their framework is central to the papers by Jeanette Gundel 'Relevance Theory meets the Givenness Hierarchy an account of inferrables', Nancy Hedberg 'Word order and cognitive status in Mandarin' and Ann Mulkern 'The game of the name'.

GHZ (1993) proposed six cognitive statuses for explaining the use of referring expressions in language. These cognitive statuses are implicationally related in the following Givenness Hierarchy:

in focus > activated > familiar > uniquely identifiable > referential > type identifiable

Each status in the Givenness Hierarchy implies all lower statuses. Like Ariel's Accessibility Scale in which the accessibility of an entity determines the choice of referential form, in GHZ's Givenness Hierarchy it is the cognitive status of entities that determines the choice of referential form. Both scales share the feature that the amount of information encoded in referring expressions is related to the salience of the referent.

Choosing referring expressions involves more than a choice of words. Two papers deal with prosodic features associated with referring forms. They are Thorstein Fretheim's 'Accessing contexts with intonation' and Marianne Mithun's 'Prosodic cues to accessibility'.

Other papers in the volume include: Wallace Chafe 'Inferring identifiability and accessibility', Östen Dahl & Kari Fraurud 'Animacy in grammar and discourse', Kari Fraurud 'Cognitive ontology and NP form', Chungmin Lee 'Generic sentences are topic constructions', Victoria Rosén 'The interpretation of empty pronouns in Vietnamese', and Marilyn Walker and Ellen Prince 'A bilateral approach to givenness: A hearer-status algorithm and a centering algorithm'.

While I found the content of the volume very good, the absence of attention to editorial detail was somewhat annoying. I found nineteen minor typos (e.g. page 140, Langacre instead of Longacre) and fifteen inconsistencies (e.g. page 12, P. Cole, ed. versus page 112, Peter Cole, ed.). Although the typos and inconsistencies do not detract from the substance of the book, one generally expects to see fewer of these in a US$85.00 investment. I should add that the extra money one pays for a hardback from John Benjamins is probably worth it. Those of you who have experienced 'the joys of glue in the tropics' after purchasing a paperback know what I am referring to.

After reading RRA, I found a nice complementary volume in the form of the *Journal of Pragmatics & Cognition*, Volume 6, No. 1/2 (1998) which is also published by John Benjamins. This volume is a special issue dealing with reference and it includes an interesting review of RRA by Kent Bach. Bach's major criticism of RRA is that while it emphasizes the importance of the cognitive status of referents, it neglects the speaker's communicative intention; however, Bach recommends this book and so do I.

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Approaches to language typology. By Masayoshi Shibatani and Theodora Bynon, eds. 1995. Oxford: Clarendon Press. 381 pp. Cloth $70.00.

Reviewed by EUGENE CASAD
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This volume is essential reading for anyone who wishes to gain a comprehensive view of what language typology is all about, as Bernard Comrie states in his foreword. Masayoshi Shibatani and Theodora Bynon have drawn on the resources of eminent colleagues from across Western, Middle and Eastern Europe, North America, and Japan—scholars working from a variety of viewpoints on theoretical and practical matters. As the editors note, the diversity of the approaches taken to deriving a typological classification of languages is partly due to the long history of typological research and to the spread of centers for such research to geographically widely separated areas (viii). This volume is designed to provide the reader with a representative and reasonably comprehensive view of this extensive and variegated field so that readers can see for themselves what distinguishes the various approaches, as well as grasp what unifies them.

Simply listing these approaches is instructive: They include the perennial Prague School, represented here by Peter Sgall's contribution (49-84), modern syntactic typology, nicely detailed by William Croft (85-144) and the diachronic typological approach, summarized here by Joseph Greenberg (145-166). The other approaches treated by papers in this volume include the Paris RIVALC group described in Gilbert Lazard's contribution (167-213), and the St. Petersburg / Leningrad group discussed by Vladimir Nedjalkov and Victor Litvinov (215-271). The final two contributions to this volume are those of Hansjakob Seiler (273-325) and Naoki Fukui (327-372), describing the interests and aims of the UNITYP Framework in Language Universals and Typology and the more formal Principles and Parameters approach, respectively.

The first two papers in this book contextualize the following ones, both historically and logically, by providing interesting and informative discussion of the historical and philosophical framework within which the entire field has developed.

In 'Approaches to language typology: A conspectus' (1-25), Shibatani and Bynon trace the roots of contemporary practice back to Friedrich von Schlegel (1772-1829) and August Schleicher (1821-1868). These two scholars laid epistemological foundations that still heavily influence the contemporary scene. They were among the first to clearly state two basic concerns for language typology, i.e. the need to classify all of the world's languages and the strategy of doing so by identifying differential grammatical patterns that point to distinct language types (3). Later developments came because of a shift in philosophical viewpoint from the Rationalist view of what language is all about and how grammatical structure relates to conceptual structure (5).

Other pieces of this fascinating and complex story include: the enrichment of von Schlegel's original dichotomous scheme (3); the shift from rationalism to a kind of linguistic relativity, due in part to the work of von Humboldt (4); the recognizance of the limitations of the enriched classical classificatory system (5ff.; cf. also Sgall, 52); the development of a multidimensional classificatory system by Edward Sapir (5-7); the emergence of the functional approach of the Prague School, as illustrated in the works of Mathesius and Skalička (7-9); the shift from wholistic to partial typology (9); the awareness of the need to specify implicational relationships between specific grammatical properties (10); and the shift of focus from describing individual languages to focus on the discovery of crosslinguistic generalizations within specific grammatical domains (9-11).

In 'Typological comparison: Towards a historical perspective', Paolo Ramat takes the story even further back than von Schlegel, noting that the roots of crosslinguistic comparison are in the 1772 work of Johann Gottfried Herder (27). Even earlier was the Abbot Gabriel Girard (1677-1748), who adopted from a still earlier source the idea of the GENIUS of a language, i.e. those general principles that determine how thoughts are expressed in particular languages (29). This paper contains an interesting account of the scholars and ideas pertinent to the shift in viewpoint from focus on 'general and speculative grammar to particular and historically determined grammars' that led to the development of the field of linguistic typology (30-1). Ramat's account of the current scene and his view of future prospects reinforces many of the points made by Shibatani and Bynon in their article.

This article is a *tour de force* adequate for broadening one's view of the entire field. Its readability for some may be somewhat hampered by several fairly long quotations from French, German, and even Latin sources that carry no corresponding English translations. Yet the book titles and philosophical terms are transparent. Some of the German terms are accompanied by English translations.

Peter Sgall adds a few details of his own to the historical picture in the first two sections of Prague School Typology. In particular, Sgall credits Gabelentz with formulating the first unpredjudiced theory of the development of language types (52). He also points to Edward Sapir as one of the two main predecessors of the Prague School; the other was F. N. Finck (50). Sgall characterizes the Prague School view of what a language type is in terms of a set of properties that reflect three points: (a) the properties of interest are linked to one another by probabilistic implications; (b) the types themselves are ideal constructs—no existing languages exemplifies fully any one of them; and (c) every existing language exhibits properties of different language types (50). The overall program of Prague School Typology is elaborate and comprehensive. Sgall traces its development from its beginning in Jakobson's work on Russian phonemics, continued by Isačenko's work on Slavic phonology and on into its extension into morphology and syntax, exemplified by the work of Skalička (53), who set up a repertoire of five language types: agglutinative, inflectional, isolating, polysynthetic, and introflexive (54). Sgall outlines all of this very nicely (54-8), discusses a variety of topics crucial to Skalička's approach (58-70), and finishes with a summary statement about where the Prague School fits within the entire field (71).

William Croft, in 'Modern syntactic typology', provides a lucid and informative survey of the crosslinguistic analysis of the properties of syntactic constructions. He gives due credit to Greenberg for launching this modern period with his landmark 1966 study on word order (85). His even-handed discussion links Greenberg's role back in time to the Prague School typologists Trubetzkoy and Jakobson (107) and explicitly notes Greenberg's insistence on getting beyond the simple statement of implicational relationships between grammatical features in order to explain linguistic universals (98).

Croft's survey is also a strong statement of a complex, multifaceted, and coherent alternative to both the structuralist and generative approaches to the question of what language universals are (127). A case in point is his discussion of the Grammatical Relations Hierarchy and the explanations that have been offered for the multifarious patterns of predicate-argument relations (112ff.) that many of us have noted in the grammars of the languages that we have studied and described. He notes that animacy is one of the most important factors that relates to the structure of the Grammatical

Relations Hierarchy and that the notion of animacy itself is complex conceptually and involves hierarchical relations. First described by Silverstein (1976), Croft provides a semantic analysis that consists of four factors that jointly operate to determine the animacy hierarchy. These include (a) Speech Act Deixis, (b) Noun Phrase type, (c) Noun Class, and (d) the Definiteness Hierarchy. Croft (118) summarizes this in the schema in (1).

(1) Speech act deixis: 1st/2nd person < 3rd person
NP Type: pronoun < proper name < common noun
Noun class: human < animate < inanimate < abstract entities
Definiteness: definite < specific indefinite < non-specific / generic

The first line in the schema can be taken to be the top end of the heirarchy in which all the included elements by definition are 'pronominal, human, and definite'. Croft goes on to note that this hierarchy is not restricted in the grammars of languages to only marking grammatical relations, but also is reflected in domains such as number marking and number agreement. This account, of course, is in stark contrast to the position of certain practitioners of formal syntax and semantics, such as Bouchard who excludes from Grammar the animate-inanimate distinction on the grounds that these features are situational (Bouchard 1995:134). As I have stated elsewhere (Casad 1998a), the fact of the matter is that many (or perhaps all) languages directly reflect these distinctions through either their morphologies or their syntactic patterns.

In 'The diachronic typological approach to language', (145-166), Joseph E. Greenberg notes that modern typology was essentially synchronic in orientation and held as one of its central tenets that a reconstructed protolanguage should conform to the constraints of synchronic typology, constraints deduced from the comparative study of contemporary languages or from the study of written records of past languages (145). The shift in focus to a diachronic view began with Jakobson, who showed that the original reconstructions of the Proto-Indo-European stop system 'violated the synchronic implicational universal that the existence of voiced aspirated stops implies that of unvoiced aspirated stops' (145).

The link of constraints on the reconstruction of the protolanguage to those of synchronic typology then leads one to the question of how languages of one type change into languages of another type (146). The stating of diachronic universals, however, is problematic and cannot be done in terms of immutable laws. Instead, as Greenberg notes, the reasonable starting point is to 'investigate change by considering constraints on typological change among occurring types within specific typologies' (147). Greenberg's specific proposal is to invoke a 'strong connection' version of a kind of state-process model for considering generalizations holding within a diachronic time frame. This 'strong connection' simply means that if one has in focus two types within a typological taxonomy, there is some way in which a language of one type can change into a language of the other type, albeit indirectly.

The rest of Greenberg's stimulating paper spells out implications of his state-process model, illustrating the various points with specific cases and highlighting a number of interesting and crucial issues related to both refining and validating the model. Particular topics include ways to elaborate the model, synchronic generalizations involving the use of variable rules, the need to account for transitional data, and the potential for introducing probablistic notions into the model for linking initial and final typological states with the transitions between them (149-51).

Another major topic that Greenberg discusses is the methodology for investigating change. Here Greenberg makes the distinction between intragenetic and intergenetic comparison. Intragenetic typology seems to be restricted to genetically related languages and dialects and poses questions grounded in synchronic typological generalizations which are then projected onto the diachronic framework. Intergenetic comparison, on the other hand, focuses on explaining change in similar typological structures found to occur in differing linguistic stocks (153). Greenberg associates his intergenetic method with the usage of the term, 'typological parallel' by the historical linguists of the 19th century (158).

Greenberg's insistence on a multidisciplinary approach to explaining the data, including drawing on the insights gained from the fields of grammaticalization and sociolinguistics (157), and his explicitly invoking of evidence converging from several different starting points for answering specific research questions, such as the directionality of a given change (156), puts Greenberg's methodological house in good order. Finally, Greenberg's statement of the typologist's task is simple, elegant, and fitting: it is both to discover all the kinds of typological changes that do occur and to generalize from that repertoire to the more limited inventory of processual mechanisms of change that indeed account for all the observed ones. A clear implication of all of this for field linguists, of course, is that there is one very huge task of describing the grammars and lexicons of the world's languages staring us all in the face.

Gilbert Lazard, in 'Typological research on actancy: The Paris RIVALC Group', finds common ground when he notes the dazzling variation in languages and the intuition that there must be something similar about them all that qualifies them to be considered human languages (168). The methodology of the RIVALC group is like the Minimalist syntax program outlined in Bouchard (1995). The term 'actancy' is taken to belong only to the level of morphosyntax, constitutes the domain of grammatical relationships between the primary noun phrases and the main verb in 'verbal' sentences (as opposed to non-verbal ones), and has no relationship whatsoever to the meaning of the sentence and the constituents that comprise it (168-9). Thus, semantic roles such as agent, patient, experiencer, instrument, source, goal, and location ostensibly have no relevance whatsoever to the analyses done by this group. Although the RIVALC group recognizes that the sets of actants varies from language to language and that there is often a privileged set of primary actants that contrasts with a peripheral set, they step back from endorsing any kind of semantically defined subject or object category in their version of grammar (170). Nonetheless, the weight of the universal presence in human languages of these two categories leads Lazard to make the following statement (170):

> However, for the sake of convenience and in order to avoid cumbersome circumlocutions, I will in the following pages, use the words 'subject' and 'object' (within quotation marks) in a non-technical and rather vague sense.

All this, of course, is in stark contrast to the approach of Croft discussed above in this review. To begin, one of the most interesting aspects of this paper is the extent to which semantic factors keep intruding into the formal account that Lazard and his colleagues employ. Thus, he notes that most instances of actancy variations correlate with differences in meaning or in communicative intent (which may be one aspect of meaning, 172). He and his group further find it necessary to look at grammatical constructions one by one, analyzing them to 'discern the relevant semantic or pragmatic distinction' (173). Semantics also figures centrally in Lazard's 'correlates' to actancy variation. These semantic correlations sometimes include precisely those notions that Lazard claims to 'have no relevance here' (169). Thus (174):

> ...in Avar, the 'subject' is in the instrumental with action verbs, in a locative case with perception verbs, and in the dative with the verb meaning 'to love'

This discussion of Avar comes under the heading titled 'Semantic content of the verbs and of the actants'. The basic incoherence of Lazard's approach is obvious from the main heading, 'The correlates'. In short, if X is a correlate of Y, by definition, it cannot be 'irrelevant to Y'.

The narrowness of the rigid formality of the RIVALC group's approach is clear from another cavalier statement about the constructions in many languages of verbs meaning MAKE and GIVE being 'obvious and trivial' (172). Lazard states the case as follows (172):

> The different construction of these two verbs, found in many languages, does not seem to teach us much about the functioning of language.

Simply stated, the volume of papers in Newman (1998) demonstrates very clearly that careful analysis of verbs meaning GIVE tells us very much indeed about the functioning of language. I can do no better than quote David Tuggy (1998:36) on the matter. As he states it in the introduction to his paper on Náwatl *maka* 'to give' (and other verbs):

> The notion GIVE is, depending on one's viewpoint, one of the most troublesome or fascinating of the common concepts by means of which we understand our world. ...the GIVE relationship is somehow inherently ternary, and this permits an intriguing complexity in the relationships of the related elements...it is less than clear which of these elements, and in what sense, naturally takes the second billing and which takes the third

For example, Cora, one of the languages for which GIVE verbs are discussed in this volume, has a set of six classificatory verbs that can be glossed as GIVE. These are built on the set of classificatory stems that can be glossed as CARRY and they in turn are related morphologically to other sets of classificatory verbs meaning RECEIVE and HOLD IN THE HAND, respectively (Casad 1998b). There is certainly nothing obvious about GIVE when an investigator examines a GIVE construction and finds no GIVE verb stem, as was the case for Roberts in Amele and Tuggy in Náwatl (Newman 1998:xi; Roberts 1998:1, 20, 26; Tuggy 1998:58).

Likewise, Lee (1996) shows that the English verb MAKE has a complex semantic structure that can be explained in a framework that has very much indeed to say about how language works. Lee shows clearly that a significant number of the 45 transitive usages of make and the 11 intransitive usages listed in Webster's International Dictionary (2nd edition) are related to one another in various ways via a common conceptual base and the alternate highlighting and backgrounding of distinct aspects of that conceptual base. Finally, the reader may compare Lazard's discussion of the distinctions between different kinds of objects and the animacy hierarchy (176ff.) with the earlier discussion by Croft in this volume.

The RIVALC paper is a stimulating one, and I am glad that it forms part of this volume, in spite of my conceptual difficulties with the methodology.

The content of 'The St. Petersburg / Leningrad typology group' by Nedjalkov and Litvinov is highly interesting for a number of reasons. For one, it supplements Sgall's discussion in this volume in a way that most readers will not notice: both the Czech typologist Skalička and the Russian Xolodovič fell under the shadow of the the charlatan of Marxist linguistics N. Ja. Marr in the 1930's and 40's and even later; both men managed to stay productive in spite of Marr; both also developed differently psychologically and it may be this to which Nedjalkov and Litvinov allude in the following passage (216):

> As is well known, the circumstances that can break one kind of character, can harden another kind. Xolodovič had a remarkable ability to learn and, at the same time, to gain and defend his spiritual independence against all authorities, whether recognized by him or not

Other comments by these two authors are very relevant to both the issue of academic freedom, the administration of research programs, and the methodology for collecting and describing data in a way that allows typologists to construct databases usable for their studies. The implications of their discussion go far beyond linguistic typology.

The approach outlined by Hansjakob Seiler in 'Cognitive-conceptual structure and linguistic encoding: Language universals and typology in the UNITYP framework' (273-275), is noteworthy for both its conceptual stance and its scope. The assumptions this group makes and its insistence on being descriptively adequate aligns this approach with that taken by Croft in its adherence to what Lakoff (1990) and Gibbs (1996) call 'the Cognitive Commitment'. In its scope, the UNITYP group is reminiscent of the range of topics covered by the papers in the four volume set edited by Greenberg et al. (1978). The work done by members of this group has been published in four different series of volumes (274) and covers eight distinct fields of interest, thus far. These include nomination, concomitance, determination, possession, apprehension (i.e. construing the notion of THING (297), participation, situation and localization (274-5).

In terms of the elaborateness of the overall framework, the UNITYP project is reminiscent of the Prague School, outlined earlier in this volume by Petr Sgall. An extended discussion of the domain of possession (275-297) illustrates nicely the kind of work that has been carried out by members of this group. Shorter descriptions of the other dimensions follow (297-314). Seiler finishes with some general remarks about the development of the UNITYP group and an appraisal of its temporal perspectives (315ff.). This is a well-written paper that deserves very careful reading.

The final paper in this volume by Naoki Fukui is titled The Principles-and-Parameters approach: A comparative syntax of English and Japanese (327-372). This is a clearly stated example of a generative approach to typology, drawing on X-Bar theory, Ken Hale's configurationality parameter and the Government and Binding approach of Chomsky (328). Fukui sets out clearly and forthrightly at the beginning of his paper the basic assumptions of this approach. The goal of this program is said to be to (327)…

> ...factor out certain general principles that govern rule application in the grammars of particular languages, attributing them to the initial state of the language faculty, i.e. Universal Grammar (UG), thereby allowing the rules of the particular languages to remain in the simplest form.

One stated result of this research program is the claim that the extraction of these general principles obviates entirely the need for specific rules of particular languages. Interactions of the general principles are said to be the driving force that accounts for the observed phenomena of the world's languages. This stretches credibility quite a ways, to say the least. It turns out that the generative conceptualization of what Universal Grammar really is, is very different from what I thought it was supposed to have been. As the following quotation from Fukui states, UG is a biologically determined entity (327-8):

> The postulation of such parameters in UG is mainly motivated by the fact that there are various superficially diverse languages in the world, a fact that is fairly obvious but none the less is rather surprising under the biological approach towards the human language faculty assumed in generative grammar, since there is no known biological reason why the mental organ UG, unlike other organs such as the faculty of number, the faculty of spatio-temporal perception, etc. should end up with different steady states (different core grammars) as it grows through experience.

For one, this reviewer finds the characterization of the human language faculty as an ORGAN at least misleading, if not inaccurate. In addition, Fukui's statement clearly assumes an autonomous faculty of language that is rigidly distinct from other cognitive systems, an assumption that many very competent linguists do not accept (cf. Langacker 1987:13). The answer to Fukui's query is, of course, that much more than pure biology is at work: the human mind is processing all kinds of inputs from the day of birth and those inputs are registered, refined and enriched through maturation (cf. Johnson 1989; Lakoff and Johnson 1980; Lakoff 1987; Langacker 1987). In Fukui's UG, mind is left completely out of the picture. And, I can well imagine that, were Charles Ferguson with us still, he would say 'I wish Fukui would stop calling it grammar,' just as he said with respect to Derek Bickerton's Bio-genesis Program a number of years ago.

In this reviewer's opinion, the differences between languages, both within the same language family as well as across languages, are not superficial at all, but are at the heart of why we need to document all the languages that we can. Fukui's proposal for accounting for crosslinguistic variation shows the same kind of misleading characterization of the picture. He states the following hypothesis (328):

> ... possible sources for crosslinguistic variation must be limited to differences in the properties of certain lexical items ('functional elements') in the lexicon or to those in ordering restrictions ('linearity').

It should be obvious to the reader that had the rest of the authors of papers in this volume (and their numerous predecessors) restricted their area of interest to just the focus of Fukui's hypothesis there would very likely be no volume such as this. And, anyone who has had a good look at primary data from at least two distinct languages knows that the range of crosslinguistic variation is very broad indeed.

To close, this volume should be found on the bookshelf of all serious students of language typology. Not only do the papers themselves address substantive issues and make generally significant contributions to this domain, the reference sections found at the end of each paper potentially open a whole world to the interested.

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Anaphora and conceptual structure. By KAREN VAN HOEK.

Chicago & London: The University of Chicago Press. 1997. 255 pp. Cloth
$55.00, paper $19.95.

Reviewed by HENK COURTZ
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Why is it that in sentences like (1a) and (1c) *John* and *him* and *his* may be interpreted as coreferential, while a coreferential interpretation of *John* and the pronoun (*he*, *He*) is prohibited in sentences like (1b) and (1d)?

(1) a. Near *him, John* noticed a trapdoor.
b. *Near *John, he* noticed a trapdoor.
c. *John* loves *his* mother.
d. **He* loves *John's* mother.

In her book *Anaphora and Conceptual Structure*, a revision of her dissertation, van Hoek tries to explain these and similar phenomena using the concepts of REFERENCE POINT and DOMINION. These concepts were previously described in the two volumes of *Foundations of Cognitive Grammar* by Ronald Langacker (who supervised van Hoek's dissertation). Langacker used these concepts to analyze possessive constructions like:

(2) the boy's knife

In this construction the possessor (*the boy*) functions as a reference point via which one can make mental contact with the possessum (a particular instance of *knife*). A dominion includes the conceptual entities which can be located via the reference point. In example (2) *knife* is included in the dominion of *the boy*.

Van Hoek states that 'reference points are ubiquitous in linguistically coded conceptions' (54), and the dominion of a reference point 'consists of the conceptual structures that are construed in relation to the reference point' (55). Using the concepts of reference point and dominion, one can describe the possibilities of coreference between nouns and pronouns as follows (57):

(3) A full nominal cannot appear in the dominion of a reference point which it corresponds to.

In sentence (1d), *John* would be in the dominion of the reference point *He*, which prevents the coreferential interpretation of *He* and *John*.

Van Hoek argues that 'the constraints on pronominal coreference can be accounted for without appeal to autonomous-syntactic notions such as tree structures or c-command, but rather in terms of semantic constructs' (232). Using the implications of the meaning of noun phrases as opposed to the meaning of pronouns, and establishing (largely on the basis of PROMINENCE and SEMANTIC CONNECTIVITY) a discourse chain of reference points and their domains, she presents explanations for the acceptability of coreferential interpretations not only (as in previous accounts) within a sentence but also across sentences.

Even though I think van Hoek is right in arguing that her insights concerning coreferentiality are superior to any autonomous-syntactic accounts of coreference, I do not see how, on the basis of notions like prominence and semantic connectivity which are difficult or impossible to define precisely, reference points and the extent of their dominions can be precisely established. Dominion appears to remain a subjective notion, potentially varying depending on one's interpretation.

Despite this lack of clarity concerning two central concepts, the book contains many stimulating ideas on topics such as coreference and connectivity in discourse, which will provide valuable insights for field linguists.

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Semiotic grammar. By WILLIAM B. MCGREGOR. 1997. Oxford:
Clarendon Press. 421 pp. Cloth $100.00.

Reviewed by E. Lou Hohulin
SIL—Academic Affairs Section

In the preface of this book, William McGregor (M) gives a brief 'linguistic' autobiography. During his graduate school days, he came into contact with Michael Halliday, and eventually adopted the overall theoretical perspective of Systemic Functional Grammar. His research for a number of years was within this theoretical framework. Now he claims to differ in a number of fundamental respects from SFG, and in this book he describes what he considers to be a new grammatical theory—Semiotic Grammar.

Semiotic grammar vs. systemic functional grammar. M believes Semiotic Grammar theory differs from SFG in the following ways:

- greater emphasis is placed on argumentation; M believes this is seriously lacking in SFG
- there is a reduction in the use of what he calls 'conceptual and terminological extravagance'
- there is an attempt to have greater internal consistency within the theory
- an account is given for language phenomena that are considered to be important to other more mainstream theories but that mainstream SFG has ignored, e.g. agreement phenomena, 'raising' and 'control' phenomena, cross-clause reference constraints, wh-dependencies, and island constraints.

M basically believes that SFG theorists do not stay adequately in touch with other theories. Unlike them, he claims that he has been influenced by a number of other theories, e.g. Dik's Functional Grammar, Role and Reference Grammar, Cognitive Grammar, and 'West Coast' functional grammar.

Throughout this book, M explains the differences between his theory, SFG, and formal generative theories.

SG theoretical concepts. M's Semiotic Grammar (SG) theory takes as its basic premise the claim that grammar is a semiotic system. He characterizes the range of semiotic phenomena in grammars of human languages and proposes a typology of linguistic signs. In doing so, he deals with language signs and their functions syntactically, semantically, and pragmatically.

Some of the important concepts within the theory are:

- Linguistic signs are constituted by a signifier and a signified, mutually defining.
- Signifiers and signifieds have both form and substance. Their form is defined by that which is emically significant; their substance is represented by the etic properties of each.
- Two fundamental entities comprise the grammar of any language: units and relationships.
- Relationships are of two primary, mutually defining types: syntagmatic and paradigmatic.
- Constituency, dependency, conjugational, and linking relationships are four distinct types of syntagmatic relationship, all of which are necessary for the description of grammatical patterns in human languages, and none of which is derivable from any other (or combination of others).
- Syntagmatic relations of these four types are linguistic signs, and the four types define four semiotic types: experiential (constituency), logical (dependency), interpersonal (conjugational), and textural (linking).

M takes these theoretical concepts one at a time and explains his point of view. Ch. 2 is devoted to giving an overview of his theory and its match to the basic concepts of grammatical theory: constituency, parts of speech, signs, syntagmatic and paradigmatic relations, and meaning. The remaining chapters discuss these concepts in depth with illustrative data.

SG aims. According to M, the general aims of SG are (7):

> to provide a) an understanding of language as a semiotic system; b) an understanding of the grammars of particular languages as semiotic systems; and c) an understanding of the shared or universal architecture of grammars of human languages, and those properties which characterize the organization of grammars as semiotic systems.

He lists seven specific aims related to the three above, and then makes the following statement: 'Two highly prized goals of mainstream linguistic theorizing are generativity and formalism. Neither of these is accorded any significance whatsoever in SG' (8). After his introduction of the aims of SG, M has a thorough discussion of methodological issues related to the differences between formal systems, using generative theory as representative of formal systems, and SG.

Another very important perspective of SG is stated toward the end of the book within a discussion of 'future prospects'. M states (388):

> It has been stressed from the beginning of this book that it is only through investigations of language in use that we can come to any reasonable understanding of the meanings of grammatical constructions. Meanings are not directly or immediately available to the consciousness or to the introspective examinations of native speakers of a language. It is necessary to amass and study a body of contextualized instances of use in order to come to any adequate understanding of the inherent meaning(s) of any construction (or morpheme, for that matter); the inherent meaning is what remains after contextual meanings have been extracted. Use must be studied in order to come to an understanding of the system that lies behind it.

As one who is involved in two language projects, this statement struck me as being particularly perspicacious. I firmly believe the claim that a thorough study of contextualized use of a language is necessary to come to an understanding of the meaning of constructions, and I also believe that to ignore the truth of these statements puts doing or facilitating quality field work at risk. For that reason, I found the aims of SG as stated and explained by M compatible with my own aims in a language project.

Units and relationships in SG. Since constituency is an important fundamental concept in 20th century linguistic theory, M discusses it as a basic concept that needs to be dealt with in any grammatical theory. He argues that neither immediate constituency or string constituency analysis is adequate in accounting for upward rank shifting, such as an adverb like *probably* which is a high level constituent that cannot be upward shifted through a phrase structure hierarchy (24-26). He believes that distributional criteria is one important feature of a linguistic unit but other features must be considered. He describes distributional criteria as being concerned with the grouping of linguistic items as units and says that such groupings can be referred to as constituents. However, when the term 'constituent' is used in the expression 'is a constituent of', he says that the term does not refer to the status of a group of items as a unit, instead it refers to a syntagmatic relationship between those items and a larger unit which contains them. For SG these are two different notions, i.e. the difference between relationships (constituency) and things (linguistic units).

In SG, function and constituency relationships are two aspects of single linguistic entities. M describes these two aspects in the following way (30, 31):

> [Function] pertains to the way in which the part relates to the whole: what its semantic effect is within the whole, what it contributes to the meaning of the whole. Whereas constituency is the formal side of the linguistic entity—its function is its meaning aspect. Function labels such as Actor, SoA (state of affairs), and Undergoer tell us something about the meaning of the unit, specifically how it contributes to the construction of the clause as a unit which

> refers to some extralinguistic situation—as distinct from the inherent meaning of the unit as a word or group of words....
>
> ...functions are not pre- or extra-linguistic semantic entities: they are both semantic and grammatical; so too are their labels both semantic and grammatical. SG treats grammar as a semiotic system and does not conceive of semantics as a separate system, tacked on to the grammar e.g. as the result of the operation of rules of 'logical form' as per GB.

M deals with parts of speech early in the book. He says that a variety of different criteria—notional, distributional, morphological, and functional—are used in the establishment of part of speech categories. He uses the functional approach advocated by Hengeveld for defining part of speech categories crosslinguistically. His definitions for four major categories are as follows (33):

> A Verbal predicate is a predicate which, without further measures being taken, has a predicative use only.
> A Nominal predicate is a predicate which, without further measures being taken, can be used as the head of a term.
> An Adjectival predicate is a predicate which, without further measures being taken, can be used as a modifier of a nominal head.
> An Adverbial predicate is a predicate which, without further measures being taken, can be used as a modifier of a non-nominal head.

In a footnote, M mentions that Croft makes a similar proposal for defining parts of speech crosslinguistically (33):

> (i) unmarked nouns are used referentially, designating objects.
> (ii) unmarked adjectives are used in modification, and designate properties.
> (iii) unmarked verbs are used in predication, and designate actions.

Constituency: The experiential semiotic. In Ch. 4, M begins the detailed elaboration and explication of the SG model with an investigation of constituency relationships—the syntagmatic relationships which define and are defined by the experiential semiotic. He states (88):

> From the experiential perspective a clause represents or constructs a SITUATION, an experiencable phenomenon which is spatially and temporally located in some (real or imaginary) referent 'world'.

Clause types are defined on the basis of his syntagmatic relationships and the four types of linguistic signs (91-92):

> 1. Any clause in which at least one constituency relationship must be present is an EXPERIENTIAL clause.
> 2. Any clause in which at least one dependency relationship must be present, no constituency relationship being necessary, is a LOGICAL clause.

3. Any clause which necessarily involves at least one linking relationship, no constituency or dependency relationship being necessary, is a TEXTURAL clause.
4. Any clause in which no experiential, logical, or textural relationship is necessary, but an interpersonal one is inherent, is an INTERPERSONAL clause.'

M illustrates these clause types with the Gooniyandi language. His English translations may help the readers of this review understand the concepts he uses to classify clauses.

Experiential clause type: 'I put the hat down.'
Logical clause type: 'This meat is rotten.'
Textural clause type: 'In the tree there are many birds.'
Interpersonal clause type: 'Here you are (take this)!'

Dependency: The logical semiotic. M begins Ch. 5 with a discussion of the fundamental properties and characteristics of dependency relations. Included in this chapter is a discussion of dependency relationships within the clause, the logical structure of the NP and the VP, logical relationships between clauses, between clauses and phrases (or words), and interphrasal relationships.

He defines dependency relations in terms of an intersection of a binary contrast between parataxis and hypotaxis, and a ternary contrast between extension, elaboration and enhancement. He believes that these two dimensions represent a classification of syntagmatic relationships as well as semiotic reality. M's subtypes of extension, elaboration and enhancement show some correlations with Longacre's Combinations of Predications, the Beekman et al. Propositional Relations, and the Mann-Thompson Rhetorical Structure Theory. For example, the dependency EXTENSION logical relation has as its subtypes, ADDITION (additive *and*, adversative *but*) VARIATION (replacive *instead*), SUBTRACTIVE (*except*) ALTERNATIVE (*or*). The ELABORATION relation has as its subtypes, EXPOSITION *(in other words)*, EXEMPLIFICATION (*for example*), and CLARIFICATION *(to be precise)*. The ENHANCEMENT relation has as its subtypes, SPATIAL *(where)*, TEMPORAL (contemporaneous *same time*, subsequent *later time*, previous *earlier*) MANNER (means *by means of*, comparison *like*), CONDITIONAL (consequential *if*, concession *contrary to expectation*) CAUSAL (reason *because*), PURPOSE (*for the reason, intending*), APPREHENSIONAL (*lest*).

Conjugation: The interpersonal semiotic. In Ch. 6, M discusses the properties of syntagmatic relationships which characterize, define and are defined by the interpersonal semiotic and identifies the main types. Like the two dimensions defined for dependency, the logical semiotic, he also postulates two dimensions for conjugation, the interpersonal semiotic. The first dimension is a binary contrast between scoping (a unit applies over a certain domain) and framing (a unit delineates the domain over which it applies). The second dimension is postulated for the distinction between three types of modification: illocutionary (relevant to how the utterance should be understood), attitudinal (relevant to speaker's attitude), and rhetorical (relevant to the knowledge framework and expectations within the interaction).

M considers Halliday's separation of thematization from information as one of his most significant conceptual advances. However, he disagrees with Halliday that the two systems are textual metafunctions. M believes that thematization is a textural phenomena, and therefore is classified within linking relationships, the textural semiotic, covered in Ch. 7. Information packaging is classified as conjugation, the interpersonal semiotic. M argues that it is difficult to determine GIVEN and NEW information on the basis of constituency structure. He then says (272-3):

> The best way to resolve these difficulties is to acknowledge that the only item within the information unit that has linguistic significance is the Focus. The Focus is the only thing which has a definite linguistic realization, and thus is the only thing which can represent a linguistically significant function... 'New' cannot be conceived of as a linguistic category; what is new in a given utterance is the Focus together with everything that falls within its scope or domain... The fact that we are dealing with a scopal relationship indicates that the information unit is not structured according to constituent relationships, but rather, according to conjugational relationships.

M concludes this chapter by saying (281):

> In this chapter we have suggested that a number of grammatical phenomena which have traditionally been analyzed in terms of constituency and/or dependency relationships are better viewed as involving conjugational relationships. These include clause complementation, tagging, represented speech, mood, modality, and information packaging.

Linking relationships: The textural semiotic. According to M linking relationships have not played a significant role in grammatical theory. He, however, believes that they are important, and that they play a mediating role between grammar and discourse. He distinguishes five main types: indexical, connective, marking, covariate, and collocational.

In Ch. 7 he gives a detailed description of these relationships. Thematization, for example, is considered to be a linking relationship, as well as a class of clauses which have an inherent grammatical relationship of linking. He also discusses reference, ellipsis, substitution, and conjunction as linking relationships. Finally, he includes grammatical markers such as relators and category markers as linking items. To his three-dimensional perspective of grammatical units discussed in the preceding three chapters, M now presents the textural semiotic, which he describes (284-5):

> [as adding] texture to this picture, specifying relationships between various pieces that go together to make up the grammatical unit. It connects the various pieces together so as to form a cohesive (and hopefully coherent) whole. In a sense this semiotic provides the adhesives which hold grammatical units together—and which bond the components to one another.

As one who desires to produce a 'practical' bilingual grammar and dictionary for a group of people living in a multilingual-multicultural environment, I found many of M's arguments for semiotic grammar compelling, largely because he attempts to explain linguistic units on the basis of the unity of syntax, semantics and pragmatics.

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A theory of predicates. By FARRELL ACKERMAN and GERT WEBELHUTH. 1997. Stanford: CSLI Publications. 402 pp. Hardback $69.95, paper $27.95.

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This book is crucially concerned with the role of the lexicon in the grammar of a language. In the early days of generative syntax, the lexicon was assumed to be essentially a static listing of irregularities: specifically, a list of the morphemes of the language (unpredictable correlations of sound, meaning, and certain basic grammatical features such as syntactic category) together with any information that could not be predicted by regular rule.

In 1970, Chomsky argued that certain derived forms, including English nominalizations like *destruction*, must be listed in the lexicon, rather than being created in the syntax. But since many such forms are created by regular derivational rules (e.g. *promote* + *-tion* > *promotion*), that means that some rules of the grammar must actually apply INSIDE the lexicon. These LEXICAL RULES were sometimes referred to as 'redundancy rules', since they were not thought of as generating new forms but rather as expressing regular patterns of correspondence between pairs of lexical items (e.g. *promote* ~ *promotion*), each of which had its own lexical entry.

Once the concept of a Lexical Rule was introduced, people began to use this mechanism to account for a wide variety of constructions, including some which had previously been assumed to be purely syntactic. For example, Bresnan (1982) presents a strong argument for treating passivization as a lexical process.

An enormous volume of research and debate has been focused on determining the boundaries between the lexicon and the syntax: which grammatical processes should be analyzed as involving lexical rules, and which should be treated as part of the (post-lexical) syntax? The strongest version of the LEXICALIST HYPOTHESIS holds that all morphological processes are lexical; rules of syntax may not create words (e.g. by putting morphemes together), nor can they refer to internal morphological structure of words. In other words, the lexicon produces complete words and the syntax must treat them as atomic (indivisible) units. A weaker version of the Lexicalist Hypothesis holds that derivational processes must be lexical, but that inflectional morphology is added and manipulated by the syntax.

Some kinds of language data pose serious problems for any lexicalist approach. For example, there are many languages in which phrasal units, which are presumably created by syntactic rules, may serve as the input for derivational (word-building) processes. Some examples are given in (1).

(1) a. **Malay *ke- -an* nominalization** (Nik Safiah, et al. 1992)

tidak	+	hadir	>	ke-tidak#hadir-an
not		present		'absence'
tidak	+	se-imbang	>	ke-tidak#se-imbang-an
not		one-balance		'state of being unbalanced, disproportionate'

b. **Tagalog verbal derivations** (Schachter & Otanes 1972:361)

wala	+	bisa	>	mag-pa-wala=ng#bisa
not.have		effect		ACTIVE-CAUS-not.have=LNK#effect 'to render ineffective'

maganda	+	gabi	>	mag-maganda=ng# gabi
good		evening		ACTIVE-good=LNK#evening

'to wish (someone) good evening'

In these examples, a syntactically complex phrase is treated as a single word (in fact, a stem) by the morphology. This leads to an ordering paradox under lexicalist assumptions, which predict that all morphological processes should apply before any syntactic rules, including those which would be needed to create the phrasal base forms in (1). This kind of data has led some linguists (e.g. Lieber 1992) to revert to the earlier model of the lexicon as a list of morphemes, arguing that the same rules which build phrasal constituents are also used to build words. In other words, there are no special morphological processes; the syntax does all the work.

Another type of challenge to the Lexicalist Hypothesis comes from COMPLEX PREDICATES like the following:

(2) a. **Hindi** (Mohanan 1994)

raam-ne	mohan-par	b^{h}arosaa	kiyaa.
Ram-ERG	Mohan-LOC	reliance-NOM	do-PERF

'Ram relied on Mohan.'

b. **Japanese** (Matsumoto 1995)

Taroo=ga	suugaku=no	benkyoo=o	suru.
Taro=NOM	math=GEN	studying=ACC	do

'Taro studies math'.

In examples of this type, two or more morphologically distinct words function jointly as the predicate of a single clause. Together they determine the argument structure and the grammatical relations assigned to each argument. Thus it seems that the two words must share a single lexical entry.

Many lexicalist treatments of this kind of complex predicate rely on special types of rules which merge two distinct argument structures to produce a new complex argument structure. Ackerman and Webelhuth (A&W) argue that this approach represents a serious weakening of the lexicalist position, in that such mergers are essentially syntactic (word-combining) operations which in effect build new lexical items (words). Their book is dedicated to supporting an alternative lexicalist analysis, based on an enriched concept of the PREDICATE.

The guiding principle of A&W's approach is that function should be given priority over form. They argue that previous lexicalist work has given priority to morphological form: if there are two morphologically distinct words, then there must be two distinct lexical entries. They propose instead to give priority to function: if something functions as a single predicate (in ways explained below), then it must have a single lexical entry even if, in morphological terms, it consists of two or more distinct words.

A&W also argue that two constructions which have the same basic function should be analyzed in essentially the same way. For example, many languages have purely morphological (i.e. synthetic) passives and causatives. Since these would be analyzed in terms of lexical rules, A&W maintain that passives and causatives should have the same kind of lexical treatment even in languages where these constructions are expressed analytically (e.g. by auxiliaries or serial verb-type constructions). This is another respect in which function is given priority over form: sameness of function outweighs difference of form.

Obviously, it requires a fairly rich model of lexical structure to accomplish this goal, since productive combinations of two or more distinct words have to be represented within a single lexical entry. A&W have chosen to use the formalism of Head-Driven Phrase Structure Grammar (HPSG) to develop their theory. This framework is in some respects quite simple: there are no transformational rules, and all semantic, syntactic, and morphological information can be represented in a single tree structure, with phrasal nodes inheriting and combining the information contained in their daughters. However, this conceptual simplicity can lead to extremely complex information structures, well-suited for computer implementation but somewhat daunting to the uninitiated human reader.

A&W do not assume any prior familiarity with HPSG, and spend four chapters introducing and developing their version of the framework. But, partly because of the large number of hard-to-remember abbreviations used in the feature matrices, it still requires a fair bit of work for a non-practitioner to understand the formal details. (For a gentler introduction to HPSG, see Sag & Wasow 1999). A&W's approach also makes use of a Word and Paradigm model of morphology, similar to that of Anderson (1992); but they do not spend much time on purely morphological details.

This choice of framework, and more generally the decision to adopt a lexicalist and non-transformational approach to syntax, represents a significant shift for Webelhuth, who is quite well known for his earlier work within the Principles and Parameters (GB) framework. The book contains some critiques of the GB paradigm, in particular concerning the proliferation of 'functional categories' over the past 10 years or so. But for the most part, it seems to be written by lexicalists for lexicalists with the goal of purifying lexicalism. Because of this, the authors feel little need to defend the basic correctness of the lexicalist position or to spell out the reasons for choosing such an approach in the first place. Many such arguments have been presented by other writers, but the present book would have been more helpful and more interesting to a broader readership if these arguments were at least summarized somewhere in the early chapters. I would also have liked to see more direct responses to the extreme anti-lexicalist position (e.g. Lieber 1992), and also to Baker (1988) who proposes a purely syntactic account for many of the same constructions that A&W deal with. However, given the already ambitious scope of the present book, this may be asking too much.

The function-over-form principle mentioned above is the key to understanding A&W's use of the term PREDICATE. Essentially, a predicate is anything that could be expressed by a single verb in some language (though they do not address the problem of noun incorporation). On page 1 they define a predicate as '… the information ordinarily associated with a single clausal head.' This definition is expanded on page 4, where they refer to the predicate as '… the determiner of central properties of clauses.' These properties include both 'functional-semantic information', such as lexical meaning, the number and semantic role of the arguments in the clause, and the grammatical relations assigned to each argument; and also 'morphosyntactic content' including inflectional features such as tense, aspect, agreement, polarity, etc.

Somewhat surprisingly, A&W do not discuss the 'classic' complex predicate constructions illustrated in (2). Instead, they focus on three other constructions which are expressed synthetically (i.e. morphologically) in some languages but analytically in others: tense-aspect, passives, and causatives. The fourth major construction type which they discuss in detail involves verbs with separable prefixes as found in German, Russian, Hungarian, Estonian, etc. A complete chapter is devoted to each of these four constructions. In each case, the chapter begins with a typological description of the relevant facts, followed by a formal analysis which accounts for both the crosslinguistic similarities and the language-specific differences observed. In each case, the analysis is largely driven by a detailed examination of data from German, Webelhuth's mother tongue, but data from many other languages is analyzed as well.

German has six distinct tense-aspect categories: the simple past, present, and future tenses, plus the perfect, pluperfect, and future perfect. Of these, the first two are expressed synthetically while the last four involve some combination of the auxiliary elements *haben* and *werden*. Since the same categories can be expressed by a single verb in other languages, these analytic tense constructions fit A&W's definition of complex predicates. Their analysis is based on an enrichment of the subcategorization features of the verb which allows the main verb to select the auxiliaries which must occur with it in much the same way it selects its complements (subjects, objects, etc.). The basic form of the verb selects zero auxiliaries, but the lexical rules which produce the future and perfect tenses add selection features for a particular AUX to the verb's lexical entry. (These rules also add various semantic and morphological features, of course.)

This is an interesting idea, almost the inverse of the well-known analysis of auxiliary verbs as Raising predicates. At first glance it may seem odd that a verb should select its auxiliaries, or that a specific combination of AUX + V should be listed in the lexicon (even if only as the output of a lexical rule). But it is clear that at least some languages must allow verbs to lexically specify their auxiliaries, as seen in the contrast (only partially predictable on semantic grounds) between *have* vs. *be* as the perfect auxiliary in Dutch, German, Italian, etc.

Stepping back from the details of specific analyses, one might describe A&W's general approach as a construction-based theory of syntax. Each specific construction, which is referred to as a TYPE in HPSG, is defined by a partially-specified information structure that can be either lexical (word-level) or phrasal. The information provided by the lexical entry of a word combines with the information associated with the construction itself to define the complete structure of a linguistic expression.

The theory of construction types is an important part of the HPSG framework. The concept of types can be illustrated using the German passive constructions. A&W discuss three distinct analytic (AUX + V) passive constructions in German, which are illustrated in (3) (from A&W, 221). These constructions are distinguished by the choice of auxiliary (*werden* vs. *sein* vs. *bekommen*), as well as other grammatical properties. (AUX follows the main verb in (3) because these examples are subordinate clauses, rather than independent sentences.)

(3) a.

weil	die	Blumen	dem	Mann	geschenkt	wurden.
because	the(ACC)	flowers	the(DAT)	man	given	became

'… because the flowers were given to the man.'

b.

weil	die	Blumen	dem	Mann	zu	schenken	sind.
because	the(ACC)	flowers	the(DAT)	man	to	give	are

'… because the flowers must be given to the man.'

c.

weil	der	Mann	die	Blumen	geschenkt	bekam.
because	the(NOM)	man	the(ACC)	flowers	given	got

'… because the man was given the flowers.'

In addition to the contrast in the choice of passive auxiliary, German also has contrasts between short (agentless) vs. long (agent expressed as the object of *von*) passives; between personal vs. impersonal (subjectless) passives; and between predicative vs. attributive passives, the latter being used in preposed participial relative clauses. Altogether there are 14 combinations of these features allowed by German grammar, so 14 specific passive constructions (or types) in German.

Types are organized into generic-specific hierarchies, with each sub-type inheriting the information associated with the more general type above it. A&W posit a universal passive archetype, which specifies only that the agent of a transitive verb is demoted to oblique status. Below this there are more specific universal types: long passive, short passive, impersonal passive, etc., each of which include the information from the higher level type (demotion of the agent) but also add further details such as expression vs. deletion of agent, etc. In addition, there is a specific German passive archetype which includes the language-specific features common to all German passives. Below this there are three specific types corresponding to the three kinds of passives illustrated in (3), etc. The type hierarchy is not subject to the 'single mother' constraint; so, for example, the 'German long personal *werden* passive' type inherits information both from the universal long passive archetype and from the language-specific *werden* passive type.

The section of the book which I found most disappointing was the discussion of causative constructions. A&W's typology of monoclausal vs. biclausal causatives seemed to me to be based on very superficial kinds of evidence. For example, marking a transitive causee as the primary object in a double object construction, as in the Bantu languages, was taken to provide evidence of biclausality, even though most languages where this occurs exhibit exactly the same double object pattern with basic ditransitive verbs like GIVE. Another uncomfortable aspect of A&W's analysis is the claim that some causative constructions are 'functionally biclausal' but have only a single predicate. It seems possible to express this situation using their formal apparatus, but intuitively it is hard to shake the feeling that each functional clause should have its own predicate. Moreover, no criteria are offered for distinguishing between biclausal constructions involving two verbs which are said to form a single predicate (e.g. German) from very similar constructions in which the two verbs are analyzed as two distinct predicates (e.g. English).

But overall the book is very well done, as one would expect from two such prominent scholars. As the reader may have gathered, I found the technical aspects of the book fairly challenging, and I suspect most other *NOLx* readers will too. The prose is clear and precise but quite dense, and tends to presuppose a fair bit of prior knowledge about various issues in formal syntax. But the book contains a great deal of interesting data and helpful typological discussion as well, which can be appreciated even without working through all the formal details.

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SALSA V: Proceedings of the Fifth Annual Symposium About Language and Society. By MANI CHANDRIKA CHALASANI, JENNIFER A. GROCER, and PETER C. HANEY, eds. 1998. Austin: University of Texas.

Reviewed by MARK MOORE
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At the Australian Linguistics Institute in 1998 I was intrigued to hear Bill Foley use the terms ANTHROPOLOGICAL LINGUISTICS and LINGUISTIC ANTHROPOLOGY interchangeably. Whether he felt the terms were either largely equivalent, with differences being trivial, or whether this usage was a provocation to any linguistic purists in the audience, I never discovered.

Whatever the case, that spirit seems to pervade this collection from SALSA V, where the writers were unrestrained in the sources of their data. Since a central premise of sociolinguistic study is that language enacts social and cultural realities, the conference cast its nets wide to capture language in many contexts.

Elinor Ochs and Lisa Capps investigate how the 'subjugated world view' of a woman suffering from agoraphobia shapes the continuing narrative by which she explains and constructs her affliction. The subject, Meg, takes elements of events and constructs a narrative very different from that which a 'normal' non-agoraphobic person would construct. This paper stands out from the rest because it outlines language from an abnormally self-absorbed narrative. Most other papers focus on how language is essentially dialogic, that is, constructed by interaction among interlocutors and potential audients. Meg's tragedy, poignantly invoked by Ochs and Capps, is that her 'dominant narrative' of agoraphobia is so powerful that normal dialogue is rendered impossible: her husband lapses into silence, and her children are drawn into supporting and nurturing the narrative.

Deborah Kapchan's paper begins with a quote from Bakhtin to the effect that language is so 'populated' with the 'intentions of others' that it is a struggle to expropriate it as an individual expression. She finds that in the language of the Algerian marketplace truth is negotiable goods rather than an absolute, and that it is validated by the acceptance by buyers of the seller's excessive, overblown offers. The theme of the dialogue is pursued through many articles: Cynthia Dickel Dunn explores the use of Japanese honorifics, which by their nature are used only in conversation; Chantal Tetreault investigates the strategic positioning of the self in interviews about racism with French students. In dialogue, one not only speaks for oneself, but also positions oneself in alliance with or against others. The individual voice here is the voice of many people.

Time and again, as well, the complex relationship between form and meaning is investigated. Jennifer Rothblatt studied the directives and permissives of New England schoolchildren and found that they were strategically deployed. Skilled children could switch from one form to another to maintain their control over dyads. Dunn's study of honorifics also made it clear that the politeness which prompted the development of these forms was no longer the essential motivation for their use. Such forms, according to Dunn, are not used amongst friends or family members, but only in formal situations where they were deployed to display the user's skill at playing the game of politeness. The forms thus indicate rather than embody politeness. Professional practitioners of the speaking in public also use their skill at manipulating iconic forms to engender reactions in their audiences. Jennifer Grocer in reviewing Phil Donahue's style found that Donahue appeared to use hesitations and disfluencies to simulate spontaneous speech, and thereby to draw out contributions from the audience. His audience responded with ploys of their own: women when discussing the 'rape-list' controversy at Brown University used the 'just-in-time' inclusion of men to encode their view of men as peripheral participants in the discourse on sexual assault on campus. Cornelia Ilie applied the same sort of analysis to the rhetorical questions used by Oprah Winfrey in her talkshow. Once again, the form belied the transparent meaning of the linguistic production. The rhetorical question uses the form of the interrogative to make a pointed statement. Contesting the statement requires effort and a counter-attack (if the original statement was aggressive) from the interlocutor.

Professional speakers simply are more expert at manipulating the forms which carry additional, context-based information. This is seen most intriguingly in Jeff Deby's piece on the HL*H intonation contour characteristic of ice hockey commentators in Canada. Deby argues that this particular intonation pattern carries various functions. It is unusual in everyday speech, so that its use marks the passage as noteworthy. Yet the pattern itself indicates a lack of closure and thereby conveys the contradictory notion that the information is commonplace, routine. Thus Deby found that the contour was largely used in play-by-play commentary as opposed to expert 'colour' passages, characterising the pattern as a contextualization cue. The contour was also prevalent in the descriptions of the frequent violence between players where it was coupled with euphemistic terms such as *jostling* for hard contact (this is reminiscent of Australian Rugby League commentators who would refer to an injured player's flowing blood as *claret*). Here commentators spoke to and for their audiences, lightening the cognitive load by using linguistic and paralinguistic devices familiar and thus meaningful to their audiences. The audience is in the mind of all speakers, especially the professional: Heidi Altman's analysis of the content of a Florida talkback radio show on fishing shows how the presenters struggle with the place of women anglers in their hitherto male-dominated sport, and the linguistic forms this engenders.

An impressive feature of this collection is the breadth of the subject matter. Keiko Emett's article investigated the conversational use of *ano(o)* in Japanese. Paul Kroeber's article concerned an orthography developed by a speaker of Thompson River Salish who felt that she was losing that language because she spoke English almost exclusively. Pamela Innes and Joan Klecan-Aker who wrote on the methodology whereby children from a non-English speaking background (in this case, Comanche children) are tested for English comprehension. Daniel Suslak gave an account of tales told in the Zoque language of northwestern Mexico, which revive the ancient legend of *Pywobachu'we* to give resonance to a Zoque man's analysis of the intrusion of American miners into Zoque land. All these articles deserve more space than can be given in this short review, but all show that language use is never culture-neutral. Always it is suffused with the living experience of its users. And language is rarely without its political dimension: Andrea Jacobs gives an enlightening account at how far linguistic prescriptivists will go to deny that THEY don't have a linguistic ideology while everyone ELSE misguidedly does. James Wilce tells the sad story of a Bangladeshi woman whose very manner of expression is denied her, and her choice to express herself in a particular way leads to physical danger for herself. And yet, data can be just as insightfully drawn from more prosaic everyday sources: Lanita Jacobs-Huey's hairdressers speak animatedly about being 'doctors for hair', the Harkers Islanders of Adrienne Cheek's piece quietly organize their kitchen conversations in a mutually-supportive way, and Jack Sidnell finds complex cultural notions enacted in children's play in a Guyanese village.

Last, mention should be made of the more 'classic' sociolinguistic papers, most notably from Lesley Milroy who continues decades of eminent work and also from Suzanne Baum in an article on bilingual children. Last of all, Troi Carleton's excellent article on elicitations from Chatino speakers of Wallace Chafe's Pear Stories exemplified what was best about this collection: strong linguistic analysis coupled with a potent delineation of the all-important context. If there were flaws, these arose perhaps from a desire to include everything, the linguistic data in all its social, cultural and historical contexts. That this is due to the nature of the subject, rather than the abilities of these writers, demonstrates the depth and richness of the subject of language in context.

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Theoretical aspects of Bantu tone. By LARRY M. HYMAN and CHARLES W. KISSEBERTH, eds. Stanford: CSLI Publications. 1998. 366 pp. Hardback $64.95, paper $24.95.

Reviewed by PAUL THOMAS
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This anthology contains the following articles (with a comment in parentheses after each article, indicating the theoretical approach taken):

Jean Alain Blanchon: Semantic/pragmatic conditions on the tonology of the Kongo noun phrase: A diachronic hypothesis (Diachronic)

Farida Cassimjee and Charles W. Kisseberth: Optimality domains theory and Bantu tonology: A case study from Isixhosa and Shingazidja (Optimality Theory (OT) / Optimality Domains Theory (ODT))

Denis Creissels: Expansion and retraction of high tone domains in Setswana (Descriptive / eclectic)

Larry M. Hyman and Joyce T. Mathangwane: Tonal domains and depressor consonants in Ikalanga (Lexical / Autosegmental)

Scott Myers: AUX in Bantu morphology and phonology (X-bar word structure / Autosegmental)

David Odden: Principles of tone assignment in Tanzanian Yao (OT)

Gérard Philippson: Tone reduction vs.metrical attraction in the evolution of Eastern Bantu tone systems (Diachronic / Autosegmental/Metrical)

Robert Poletto: Constraints on tonal association in Olusamia: An optimality theoretic account (OT)

I recall how, 13 years ago, I approached fieldwork on the western Bantu language Komo (group D) with trepidation because it had morphemes with tonal content, a quite alien category for a native speaker of English. But then, autosegmental (Clements and Goldsmith 1984) and lexical (Pulleyblank 1986) treatments of tone began to demystify things, showing me patterns to look for as I collected data. (The first of these deals specifically with Bantu.) Nevertheless, I was troubled by sometimes having to resort to ad hoc rules and derivations that more resembled language-specific algorithms then exponents of the harmonies that exist among the Bantu family of languages and in language in general.

Hyman and Kisseberth have here collected a second set of Bantu tone case studies, most of which have the object of exploring the interactions of linguistic theory, particularly morphological and phonological theory, with a family of languages. I was repeatedly struck by the very detailed similarities in morphotonological phenomena existing between Komo and other Congo basin Bantu languages in DRC on the one hand, and eastern Bantu languages from the other side of Africa, which most of these articles discuss, on the other hand. The book presents as a toolbox of theoretical concepts, notational devices and crosslinguistic phenomena that field researchers 'can invoke in extracting appropriate generalizations from [their] data' (33).

Three of the articles use the Optimality Theory (OT) framework. I'm disappointed that there weren't more. However, Odden (49 pages) and Cassimjee and Kisseberth (C&K) (99 pages) travel through very comprehensive data sets, and two of the three articles (C&K and Poletto) assume little prior knowledge of OT. For people unfamiliar with the OT framework, I would read them in the order Poletto (basic introduction), Odden, C&K (detailed introduction with extension of OT to Optimality Domains Theory (ODT)). For people unfamiliar with Bantu morphology, I would recommend tackling Myers before any of the three OT articles.

Some of the analyses were elegant in the straightforward way that the concept of ranked, violable, and universal constraints can be used to explain tonal alternations. C&K's treatment of Shingazidja (Comorros, related to Kiswahili) wins the prize for combining a simple but odd-sounding generalization about the data with an analysis showing how this can result from a ranking of constraints, the constraints having been attested in other languages, but with different rankings.

Here is C&K's generalization about Shingazidja tone (120):

> (1) A rise in pitch occurs on the mora in front of every even-numbered underlined vowel

C&K elsewhere identify 'underlined vowel' with H-sponsor. (Why not just stay with 'H-sponsor' instead of resorting to nomenclature that has no theoretical status?) In the case of words with single underlined vowel, that vowel manifests a rise in pitch when the word is spoken in isolation. (It gets more complicated with words containing two underlined vowels.) Can a language actually do this? Check this out from page 120, example 157:

(2) tsihulu̱ mága̱ri mé̱ndji̱ 'I bought many cars'
bá̱ngi̱li zí̱ndji̱ 'many bracelets'
tsihulú̱ ba̱ngi̱lí zi̱ndjí̱ 'I bought many bracelets'

In an early section of the paper, C&K motivate a set of constraints that are particularly applicable to Bantu tonal systems (though most can be relevant to other phenomena or other language families). Indeed, a number of the constraints come up repeatedly in other papers throughout the book. They then show how different rankings of these constraints are (almost) all that is necessary to account for tonal data in two languages, Isixhosa and Shingazidja.

I said 'almost'. C&K leave as residue the fact that, within their framework, they cannot account for the possibility that a word or phrase containing no phonological pitch (or H-domain) at all may satisfy all the posited constraints (124). Consequently, domainless candidates in their tableaux appear to better satisfy constraints than the winning candidate. Poletto solves a similar problem by simply including a highly ranked constraint that each stem (in the case of the language he was studying) realizes an H. By substituting 'word' for 'stem', C&K could have avoided having to discuss this residue using verbiage that I found confusing.

There were plenty of 'Aha!'s' arising out of these articles, particularly in Myers's article. In Komo, verbs are composed of (1) an inflectional morpheme complex, which can contain up to four syllables and express conditionality, distant past, number, and negation in the consonants and subject person in a repeatable vowel; (2) an optional incorporated adverb; and (3) what Myers calls a macro stem, maximally consisting of a present participle marker, an object prefix, and the verb stem. For example,

(3) ɗ-é-ɓ-é-k-é mɔ́nɔ ɔ-m-ɓɛ́t-a 'we were not hitting him/her
1 2 3 2 4 2 5 6 7 8 9 at all long ago'

1 distant past
2 first person subject (repeated twice)
3 plural
4 negative
5 'at all'
6 present participle marker
7 third person object
8 'hit'
9 imperfective

Myers claims that an inflectional stem, or 'Aux', such as in Komo *ɗéɓéké* in (3), is necessary to account for tone patterns in a number of Bantu languages. He shows that this is the case for Shona, Tonga, Digo, Swahili, and Kirundi, all eastern Bantu languages. This seems to make sense for western Bantu Komo as well with regard to non-tonal phenomena. It accounts for the possibility of adverbial incorporation between the inflectional and macro stems in the imperfective, and the interruption of -ATR harmony back from the root in (3) (cf. *ɗɛ́ɓɛ́kɛ́ɔmɓɛ́ta* 'we were not hitting him/her long ago', *ɗɛ́ɓɛ́kɛ́mɓɛ́tí mɔ́nɔ* 'we didn't hit him/her at all long ago', **ɗéɓéké mɔ́nɔ mɓɛ́ti*).

I have three critical comments.

First, it would have been helpful for C&K to summarize the arguments that the concept of domains is a necessary extension of the OT framework, that is, that OT cannot efficiently or elegantly account for the data that C&K present without resort to the extension. Alternatively, they could have cited a paper that accomplishes this. They do neither, however. The closest they come is in an apparent aside (42):

> We believe that when one explores these matters in detail, the domain structure approach turns out to not only be more elegant than the autosegmental approach, but in fact deals more adequately with the empirical data by providing an understanding of phonological opacity not available to autosegmental-based OT (see McCarthy 1995).

As of this writing (May 1999), the book in which McCarthy 1995 appears is not yet available in Amazon.com or BarnesandNoble.com. McCarthy 1998 does in fact deal with opacity in an OT context, and in terms unrelated to ODT. In fact, C&K do not anywhere discuss the relevance of ODT or the data they present to the opacity problem.

Next, where a large number of constraints are relevant to accounting for a certain set of data (I counted 15 in C&K), it would help the reader considerably if there were references back to where each constraint is introduced.

Finally, there were numerous errors. Some are typos, such as the page headers in Phillipson's article 'Tone Reducation [sic] vs. Metrical Attraction'. Others are contextually wrong (but correctly spelled) words, e.g. 'Below we shall [sic] other combinations' (118). Others are difficult-to-parse sentences, as in Poletto's article (340):

> While on the level of the segment (*viz.*, the root node) the high is not associated to the left edge of the stem that is not a concern.

What is it 'that is not a concern'?

This is unfortunate for a book that the editors hope will be in the same league as Clements and Goldsmith (1984) (cf. the preface, vii). (I examined 10 pages of Clements and Goldsmith, and found no typos or wrong words. In addition, association lines were better aligned between vowels and tones.)

Usually, these problems are aesthetic in nature, but sometimes they get disconcerting, particularly when inaccuracies come up in the data, such as this pair from C&K's (157):

(4) tsihulú̱ ba̱ngi̱lí zi̱ndjí̱ 'I bought many bracelets'
ri̱húlu̱ bá̱ngi̱li zí̱ndji 'we bought many bracelets'

Generalization (1) doesn't work for the second line of (4) as written. The last high tone in the second line cannot be there. For it to work, the final vowel of *zi̱ndji* needs to be underlined, as it is in the first line.

These shortcomings aside, I recommend this book for anyone planning a linguistic adventure in a Bantu language where tonal phenomena will be encountered.

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Algebraic semantics in language and philosophy. By GODEHARD LINK. CSLI Lecture Notes, 74. New York: Cambridge University Press. 1998. 432 pages. Hardback $64.95, paper $24.95.

Reviewed by JOOST ZWARTS
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This book brings together fourteen articles about pluralities and events that Godehard Link wrote since 1983. As the title indicates, the subject matter lies at the junction of mathematics, linguistics, and philosophy. In his articles Link wants to show how particular algebraic structures can be employed to solve linguistic and philosophical problems.

The essence of his ALGEBRAIC SEMANTICS is that the models that are used to interpret natural and logical languages have the algebraic structure of a LATTICE or BOOLEAN ALGEBRA. Roughly, this means that we can do a kind of arithmetic with the objects in the model by forming SUMS of them. For instance, the denotation of the conjunction, Laurel and Hardy, is the sum of these two men, Hardy+Laurel, a 'plural individual' and the denotation of a plural noun like *gentlemen* is the set of all possible sums of gentlemen, including this couple.

Link shows the linguistic relevance of this idea mainly on the basis of phenomena with plurals in English, like the often discussed distributive and collective interpretations of sentences like 'Laurel and Hardy carried the piano upstairs' (each vs. together).

The philosophical aspects of algebraic semantics that Link discusses are somewhat harder to appreciate for a non-philosopher and for anyone who cannot fully understand why some philosophers want to be nominalists and some logicians prefer to stick to first-order predicate logic. We can safely ignore that part of the book here.

The book has fourteen chapters and an appendix: 1. The logical analysis of plurals and mass terms: A lattice-theoretical approach; 2. Plural; 3. Hydras. On the logic of relative clause constructions with multiple heads; 4. Generalized quantifiers and plurals; 5. *Je drei Äpfel*—'three apples each': Quantification and the German *je*; 6. First-order axioms for the logic of plurality; 7. Ten years of research on plurals—Where do we stand? 8. Algebraic semantics for natural language: Some philosophy, some applications; 9. Quantity and number; 10. The French Revolution—a philosophical event? 11. Algebraic semantics of event structures; 12. The ontology of individuals and events; 13. The philosophy of plurality; 14. Mereology, second-order logic, and set theory; Appendix: A chapter in lattice theory.

Due to the nature of the volume (a compilation of articles), there is some overlap between the chapters. The logic of plurals that is introduced in the first chapter is explained again in many of the other chapters, a repetition that might however be useful if one is not yet at home in this complex subject matter.

For a linguist interested in the semantics of plurals and mass nouns, the first few chapters could be useful, especially Ch. 2 which gives a systematic exposition of the semantics of plurals, Ch. 7 which reviews some recent literature concerning this topic, and Ch. 9 which makes some crosslinguistic comparisons concerning grammatical number and classifiers, with little bits of German, Chinese, Japanese, Arabic, Georgian, and Korean. However, except for these examples and a discussion of German distributive quantification in Ch. 5, English provides almost all of the language examples.

The kind of linguists that might be interested in the book are those with an orientation in formal semantics, with philosophical inclinations, and working mainly on semantic phenomena in English and other western languages.

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